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The Arboretum Bulletin

Getting Acquainted With Northwest Trees

By HUGO WINKENWERDER*

NATURE offers a wealth of pleasure to lover of the great out-of-doors in the many objects, both animate and inanimate, that abound everywhere. This pleasure is increased many fold to those who can recognize these objects and understand their several relationships. To him, who sees and understands, every turn of the trail offers something new and interesting. In this great Northwest the trees and forests are not among the least of Nature's handiwork.

It is true that this region does not possess the wealth of species found in the eastern forests, but what it lacks in species it makes up in size, for where else in the entire world are the forests more wonderful in the density of their growth or the majesty of their development? Trees eight to ten feet in diameter, towering 250 feet in height, are not uncommon, and it is not at all rare to find more than 150,000 feet of merchantable timber to the acre.

To be able to recognize the trees and know them by their correct names is the first step toward their appreciation, and the further we get into the subject the greater the pleasure it affords.† To encounter a rare species which one is able to recognize gives one all the pleasure of meeting a dear old friend.

However, to be able to recognize the trees and to name them is only the first step toward knowing them. To know them one must study their life habits, the sizes they attain, their rate of growth, their special likes and

dislikes for different soils, their requirements for moisture and light, what other trees they naturally associate with, their influence for good and evil upon their associates, and the uses to which they may be put. Every forest is a living organism in and of itself, just like a community of people with an individuality and character all its own. Each tree plays its part in the community life. When we recognize these things the study becomes to a certain degree really fascinating.

Washington and Oregon have a total of only about 80 native species. Forty-six of these belong to the broad-leaved deciduous group and thirty-four to the evergreen cone-bearing class. The former are ordinarily known as hardwoods and the latter as conifers. The yew, though not cone-bearing, may for practical purposes be included in this group. The trees, especially the genera of this region, are really very easy to distinguish from each other. All the conifers can be divided into two general groups: (1) Those with needle leaves, to which the pines, larches, spruces, hemlocks, true firs, the Douglas fir, the redwood, and yew belong; (2) those with very small scale-like or awl-shaped leaves, including the incense cedar, the western red or shingle cedar, the Alaska and Port Orford cedars (together forming the genus of true cedars), and the junipers. Of this latter group the junipers are the only ones that have awl-shaped leaves and both scale-like and awl-shaped leaves are usually present on the same tree and will distinguish this tree from all other native genera. The fruit of the junipers is a cone but the cone scales are modified in such a way as to make the fruit appear berry-like.

Practically all of the genera of the conifers can be distinguished by the leaf and twig char-

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†In a short article of this kind it will only be possible to point the way toward getting acquainted with our trees.

acters and as the leaves are present the year round in all except the larches, these characters are available for study at all times. If now we take the first, or needle-leaved group, they can be divided into pairs, each pair having some one very definite character that will distinguish it from all the others, and then again there are other simple characters for distinguishing the two members of each pair from each other. Thus, the pines and larches always bear their needles in bundles, the pines two to five and the larches many in a bundle. The pines also are evergreen and larches shed their leaves each autumn. In winter the latter can be distinguished by the numerous short, knob-like branches on the ends of which the leaves are borne. The spruces and hemlocks bear their individual needles on little elevated leaf-cushions that remain on the twigs after the leaves fall, but the spruce needles are stiff, angular and sharp pointed, while those of the hemlock are flattened and have rounded tips. The true firs and the Douglas fir, instead of bearing their needles on cushions, come off practically flush from the surface of the twig, and when they fall leave a flat round scar, but in the case of the true firs the scar is prominently indented into the surface of the twig, whereas the Douglas fir scar is flush, except for a slight elevation on the edge opposite the tip of the twig. In the yew and the redwood the needles are attached by a strap-like prolongation which is fastened to the twig for some distance. At the point of junction between needle and twig, the yew has a stalk-like constriction which is absent in the redwood. These simple characters may be used as positive means for distinguishing these genera.

In the cedar group all have their ultimate branchlets flattened with the exception of the junipers. The scale leaves are very small and except in the junipers they always occur in pairs opposite each other. One series of pairs covering the upper and lower surfaces of the flat twigs and the others folding around the edges. Each pair overlaps the pair just above it. The way in which these scales overlap is useful in identification. In using the following characters be careful to examine only the scales near the tips of the small lateral branchlets. In the incense cedar the two leaves which are folded around the

edges of the twig have long bases and they do not meet from opposite sides unless it is at the very bottom of the scales. In the western red cedar these two leaves meet in a point about the middle of the scales and in the true cedars they meet in a short line. In the true cedars the leaves and branches are also finer than in the western red cedar. In the juniper the little branchlets are square or round on the branches that bear scale leaves. This, together with the presence of some awl-shaped leaves and the berry-like fruit will always distinguish the juniper from all the others.

Although it has been possible to give definite characteristics for all the coniferous genera, in the hardwood or broad-leaved trees it will be impossible in a short article of this kind to do more than indicate, with examples, the methods to pursue in their study. Many persons depend almost entirely upon the leaves and flowers. However, as these are not present on the trees throughout the year they are available for study only during certain seasons. For this reason the buds, leaf-scars, and other twig characters are much better. The first thing to look for is whether the arrangement of the parts—buds, leaf-scars and branches—is in opposite pairs or whether these organs alternate around the branch *i. e.* are spirally arranged. Thus, for example, we have in this region only four native genera with the opposite arrangement, namely, ash, maple, dogwood, and elderberry. The elderberry differs from all the others because of its extremely large triangular to horse-shoe shaped leaf scars and the very large soft pith found in the center of the twig. The others can readily be distinguished from one another, first by the angle the twigs make with the branch on which they are situated. In the ash the short stiff twigs stand out practically at right angles where they come off the branch, in the maple at an angle of 45 degrees, and in the dogwood there are whorls of straight branches coming off from the terminal shoots but further back on the lateral branches numerous small twigs can be seen all curving upward more or less regularly. The leaf scars and buds also are distinctive. In the dogwood the leaf scars always meet from opposite sides around the twig but through a reverse bend make a small V pointing away

from the tip. In the maple they also meet from opposite sides but make a V pointing toward the tip of the twig. In the ash, however, they rarely meet from opposite sides. In the examination of all of these characters it is always well to keep toward the tips of the twigs and to examine a number of specimens to see which character is the predominating one.

Another very useful character is to be found in the bundle scars. They are represented by small dots within the leaf scars and mark the broken ends of small water tubes that extended from the twigs into the leaves. In the dogwood there are always three of these. In the broad-leaved maple there are usually five (sometimes more) and they are very prominent, whereas in the vine maple always three, so that this feature will also distinguish these two species of maples from each other. In the ash, the bundle scars are very small and numerous and arranged in a curved line open toward the top end but in general following the outline of the crescent or shield-shaped leaf scar. The number and arrangement of the bundle scars are useful in the identification of nearly all of the hardwoods.

Of even greater importance, however, than the bundle scars are the buds. Although not generally available in the spring next season's new buds are in most cases formed by summer. Thus, for example, cascara has its buds naked, *i. e.* the little leaves in the bud are not covered by any bud scales. The willows on the other hand always have one single scale enfolding the entire bud; in the dogwood there are two long pointed scales nearly covering the bud from opposite sides, and in the alder there are three bud scales closely united at their edges so as to just enclose the bud completely. The ash has very short, squatly buds with thick scales.

All of the other hardwoods of this region have buds with numerous overlapping scales. The shape, color, and covering of the bud is also important. Alder has large reddish-brown buds that are club-shaped and distinctly stalked; in the hazel and black haw the buds are more or less globular, but in the former they are grayish in color and both buds and twigs are covered with fine hairs, whereas in the latter the buds and twigs are

reddish and smooth and shiny. Usually there is only one bud at the top of a twig, but in the oak and the chinquapin, and sometimes also in the cherries, one will find more than one, though in the cherries it is more common to have several buds situated side by side just above the same leaf scar, and this is not true in any other trees of this region. The cherries, as also the poplars, some of the birches, and the California laurel, can be distinguished by the characteristic taste or odor of the buds and twigs.

The pith in the twigs of the trees of this region is usually solid, white or light greenish in color, and circular in cross-sectional outline, but in the alder it resembles the ace of clubs, and turns a deep purple when exposed to the air. In the oak it is a five-pronged star; in the hazel it is round but varies in color from a light yellow to a deep brown, and in the hackberry although it is solid, it is interrupted at the nodes so as to form a series of little plates that can be seen by cutting through the twig longitudinally. Other characters that are useful are the presence or absence of hairs or resin in buds and twigs, the color of the twigs, the presence of prominent dots, or lenticels, as in the bark of the birches and cherries.

It is also possible to learn to recognize the different trees as seen from some considerable distance by means of the general shape of the crown, the way in which the branches come off, and the color. In western red cedar, for example, all except the uppermost branches come off with a long downward sweep and then turn upward at the ends, like the horns of a Texas steer. In both the spruces and the true firs, especially in the young trees, the branches come out stiff in more or less equidistant whorls. Hemlock has a very fine spray of lacy leaves and branches all through the crown and is of a dark bluish cast, the spruces in addition to the shelf-like arrangement of the branches have a light blue cast, whereas in the pines the spray is coarse and the cast light blue or yellowish, depending upon whether it is a white or yellow pine.

Among the hardwoods there are other similar features which may be used in the same way, and then, too, every tree has a characteristic bark, but space forbids going into

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Forestry—Washington's Future

By CHARLES C. COWAN

FOREST protection throughout this state is not an end in itself, it is but a means to an end. The objective sought is the crop which is to sustain the future lumber output. The lumber output will sustain a large portion of our wage earners. The product of the forest and the mill is essential to sustain profitable transportation systems of rail and sail. This freight sustains the handlers. All sustain the tax structure of the state.

We who have spent many years in what is generally termed forestry, who have sufficient experience to forecast the future, based on terms of the forest history of this state, cannot be otherwise than firm in the conviction that the Douglas fir region is bountifully endowed by nature to restock the harvested areas—if given a chance. The proof of this screams for recognition from every hillside. “Keep fires out, and the harvest is yours for the effort.”

Did you, my reader, know that in this state we now have over 4,000,000 acres of vigorously growing new forest—the nest egg of the future? Did you know that we have over 2,200,000 acres of agricultural land producing farm crops on lands won, with extreme difficulty, from what was once virgin timber? Did you know that Douglas fir, and its associated western species, with their periodic seed crops, can furnish our logged-off areas if but given a fair chance? If you know this, then we are assured of our future. If you merely “guess so” or “believe so,” then you have not the interest in our forest future that should be yours, for only when you fully know and realize that our forests do regenerate by natural selection, then only will you begin to wonder why some logged-off areas have second growth while other similar areas are bare. Then only will you begin to find out “why”. Then only will you inquire into the history of such lands, to be constantly confronted with the same monotonous answer—a fire followed the original slash fire, burning up the new seedlings, destroying the seed trees. Then and then only will you fully appreciate the cry of the forest protection agencies: keep fire out—prevent forest fires. Sometimes there is a tail tied to this slogan,

and the tail is every whit as important as the dog it wags. The tail is “It Pays”. Pays whom? Why, it pays you and each one of us who lives in this state; every farmer who has a barn to build, a fence to erect, or produce which requires boxes. It means foreign trade. It means railroad ties. It means a forest cover grown by man, paying its full load of taxation for every year of its life.

The present forest crop was fully grown when the white man arrived to convert the trees into the stuff of which cities, towns, states and counties are built—trade. It did not pay taxes during its growing cycle, but the growing forest will, and man, being what he is, will grant a greater measure of care to his own consciously produced forest, his own economic future, when he is conscious that by his own efforts is the forest future sustained.

Here then is the real reason for forest protection, for fire prevention. Every carelessly thrown match or cigarette, every carelessly left camp fire, every careless act of land clearing, every chance taken by careless loggers, jeopardizes your future—our future. We, all of us, have a stake in prosperously growing forests. We reap some part of the harvest, directly or indirectly. The future of the State of Washington is the future of its growing forests.

Today, we have still another reason for preventing fires, and that is national defense. The military authorities ask the protection agencies to keep smoke out of the air. This, because of aerial navigation. Every person who reads the daily papers knows that plane crashes are most prevalent during fog. Forest fires create smoke, and smoke is, in effect, a man-made fog.

We have hundreds of planes in the air these days, piloted by brave young men, who accept training hazards as part of the job of defending their country. Certainly we, on the home front, should not add one bit to this hazard. Rather should we make every effort to keep the air clear of smoke. It is so little to do, to exercise normal care, when lack of care might be directly responsible for the crash of a plane and the death of its crew.

Doubly therefore have we an interest in the slogan: “Prevent Forest Fires—It Pays.”

Forest Industries of Washington, Present and Future

By O. HARRY SCHRADER*

PROPHECY is an art open to one and all, regardless of past experience. Any attempt to forecast the future should, however, be based on an adequate understanding of the present. One of the most common faults in predicting is a tendency to become over-enthusiastic and permit oneself to be carried away on a wave of bubbling enthusiasm. We read frequently in current literature that we are approaching an "Age of Plastics" or an "Age of Light Metals." The proponents of such philosophies are guided almost entirely by the vision of the "multiple use" that may be made of these materials, and conveniently forget that in the future we still will have available almost all of the materials we are now utilizing. They also forget that these materials will improve in quality and adaptability and that with such improvements, reductions in cost are likely. The utility of any material is largely dependent on two factors: (1) the properties that fit it for any particular use, and (2) its cost.

The forest industries have always constituted the most important industrial group in the economy of the state of Washington. It has been estimated that as much as 60 per cent of the population of this state is directly dependent on these industries for a livelihood. Such a figure must of necessity be an estimate because of the impossibility of obtaining an accurate measure of the degree in which the forest industries contribute to related business, such as, for example, transportation. The present degree of dependency of the citizens of this state upon our forest resources demands careful consideration of the future of these resources so that we may continue to prosper and develop.

The abundant forests of the Northwest were once regarded as an inexhaustible resource. The geographic shift of the center of lumber production from the Northeast to the lake states, thence to the Southeast and finally to the Pacific Northwest as the forests in each of these areas were depleted, graphically portrays the fallaciousness of this concept. For nearly thirty-five years, the state of Wash-

ton led the nation in the production of lumber, but in 1938 was forced to relinquish this honor to the neighboring state of Oregon, as our accessible stands of virgin timber have finally begun to dwindle. Belated recognition of the importance of scientific handling of forest lands, and planning for the future, is assurance that we will not suffer the fate of other deforested regions of this country. Private timber owners and operators have become conscious of the necessity of planning their operations on a sustained and perpetual basis. State, federal and private agencies are encouraging and assisting these operators in their planning.

In surveying the forest industries of this state at the present time, our judgment must be largely tempered by recognition of the effects of the war emergency. The shortages of manpower and machinery must inevitably result in sidetracking any new developments that do not contribute directly to the war demands. The production of needed war items must necessarily be emphasized. Governmental demands and enforced restrictions on prices are the most important factors in determining policies and development in these industries today.

The forest industries of Washington are many and varied, but the most important, from the standpoint of capital invested, number of employees and value of products is the lumber and timber industry. Among the important timber trees native to this state, all premium woods in the construction field, are Douglas fir, western hemlock, ponderosa pine and western red cedar. Douglas fir is one of the most widely used and highly prized construction woods in the world, and the inherent characteristics of the wood of this species are such as to guarantee its future in this field as long as it is available in quantity. Western hemlock, a species that for many years has had to overcome the handicap of the dubious reputation of its sister species, eastern hemlock, is rapidly becoming an important construction wood, and is now regarded with favor in the fabrication of many types of aircraft. Ponderosa pine, a wood that finds its principal utilization in finish and box lumber has many desirable qualities that particularly befit it for such uses. Western red cedar is

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preeminent as a wood for exterior service as shingles and siding.

Wartime Uses of Our Timber Resources

The sawmilling industry is working at nearly top capacity producing vital war needs. Among these requirements are construction grades of lumber for army and navy installations, structural grades for shipyards, aircraft factories and hangars and many other industries, and aircraft and pontoon lumber which demands the highest grades obtainable. The limiting factor in present-day production is log supply, which in turn is largely controlled by available experienced woods-labor. Geared to this war effort, the industry has been forced to forego supplying the usual civilian demand except to the extent that the government has authorized war and defense housing. In looking to the future of the sawmilling industry there are several encouraging factors to be considered. Improvements in methods of manufacture are already evident, particularly in the fabrication of wooden members by gluing or by the application of various mechanical devices. Such processes as these will permit the manufacture of lumber items and timbers of all sizes and shapes, regardless of the size of logs that are available. Formerly the structural timber field demanded large virgin-growth logs as a raw material to supply the large size timbers needed in industry, but in the future the greater proportion of this demand will be supplied by fabrication from smaller stock. This also permits the fabricator to cut out and eliminate many defects such as knots that reduce the strength quality of solid timbers. Various methods of raising the value of low grade lumber will undoubtedly be investigated and proven. One progressive manufacturer is now raising the grade and value of low grades by pressure-gluing loose knots in boards so they will not subsequently drop out.

Recent improvements in methods of drying lumber, particularly large-size stock, is another encouraging factor. The problems of lumber drying have always militated somewhat against its usage in many situations. The necessity of furnishing properly dried materials for many war uses has resulted in experimentation and improvement in drying methods which will react as a favorable factor

in the marketing of lumber products in a peaceful world.

Pulp and Paper Uses Are Important

Next in the order of importance among the forest industries of the state is the manufacture of pulp and paper. This industry is using vast quantities of several of our native species. Among these are western hemlock, Sitka spruce and white fir. These species are the finest in the world for the production of high grade paper and rayon, and are generally quite plentiful. It is doubtful if anyone could accurately predict the future of this industry. It is not restricted to the utilization of large-sized timber, and as utilization standards change, it may conceivably make use of much material that the logger now passes by because of small size or poor quality. The success of the pulp industry in the Southeast, where almost all of the pulpwood comes from second-growth stands, thus taking advantage of the extremely rapid rate of growth exhibited during the first 30-60 years of age of such stands, is illustrative of similar possibilities in this state. Second-growth stands in the state of Washington have in the past not been given much consideration as a source of pulpwood because of the abundance of old-growth timber, but the potential value of such holdings is now becoming evident.

Use of Secondary Species

The possibility of utilizing species other than those previously noted is ever-present in pulp and paper manufacture. Technical problems that prevent such use today must be overcome, but the utilization of the resinous southern pines as pulp species is indicative of the future. Twenty years ago it was thought that southern pines could never be satisfactorily pulped, yet today they are among the most important species in this field and even produce the high grade pulps used to manufacture rayon. In the Northwest we have immense quantities of Douglas fir in the form of sawmill waste, or defective and small size logs, that potentially may be used for pulp if technical difficulties can be overcome. With the exception of small amounts used in the manufacture of soda pulp, heavy papers and fiber board, no Douglas fir is used in this industry today.

The increasing interest in raising the stan-

dards of utilization of wood which is being manifested by closer integration of various by-products industries with primary industries should also be a factor in expanding the future of the pulp industry. Pulp products are finding ever-widening fields of utilization. To mention a few, the manufacture of insulating boards, building boards, treated wrapping papers, cellophane, and rayon now require large quantities of pulp.

Using Waste Products

One of the big question marks in this industry has been the disposal of waste cooking liquors containing in excess of 50 per cent of the original wood content. Disposal of these liquors in the past has been largely a problem of preventing water pollution with the consequent destruction of fish and other forms of marine life. More recently the emphasis has changed to utilization of this material rather than its disposal. Many by-products can and are being manufactured from this waste liquor but to date none of them is sufficiently important to make use of more than a small portion of this waste. Research chemists throughout the world have been concentrating on this problem and it is reasonable to suppose that considerable progress will be made in the future. If and when a satisfactory solution of this problem is worked out it will be a tremendous stimulus to the entire industry.

Plywood Possibilities

Third on the list of forest industries in Washington is plywood. The meteoric rise of this industry during the past fifteen years has been truly spectacular. Plywood is a product designed to neutralize many of the natural disadvantages of solid wood while maintaining the desirable qualities. Of balanced construction, plywood partially overcomes and equalizes shrinkage, balances strength qualities in different directions across the faces and permits utilization of wood in greater widths than are obtainable from sawed lumber. Available in many grades, it is used for finishing and decorative purposes, partitioning, and for exterior applications such as concrete forms and general construction purposes. Glues have been developed which will give almost indefinite service in exterior situations exposed to the weather. Plywood may be classed as a "semi-plastic," in that it may be

molded to many curved forms by using heat and pressure. This ability to be molded has permitted the use of plywood in the construction of aircraft parts, for example, as a wing or fuselage covering material. The strength and stiffness of plywood compared to other materials is a great asset in such applications.

The veneer industry, which is related to plywood in method of manufacture and differs chiefly in the manner of assembly, makes use of high grade expensive woods as a surface finish over less valuable woods as cores in the manufacture of furniture and similar articles. Although there are no valuable furniture woods native to this state, prior to the war a considerable quantity of Philippine mahogany was imported and sliced for such veneering applications.

Low-grade veneers of species that are inferior for surface finishes find considerable application in the packaging business. Many agricultural products of this state are packaged in containers made of Washington veneer.

The plywood industry in this state is largely confined to the use of Douglas fir, but recently some hemlock plywood has been manufactured and more will be used as the problems of cutting and drying this species are solved. Spruce plywood, manufactured in small quantities, is highly prized as a structural aircraft material. According to present standards of utilization, this industry requires the largest and best grades of logs available and eventually discards a core of considerable size. The manufacture of plywood in the Scandinavian countries has shown that small, defective logs can be used and it is therefore likely that a similar utilization can be effected here as the supply of "peeler logs," as these large logs are known, disappears. Removal of defects in sheets of plywood and veneer by cutting them out and replacing them with patches and edge-gluing to make up wide face sheets are now universally practiced and encourage the use of lower grade materials. With proper matching such repairs are scarcely evident in the finished sheet.

Plywood may be finished by coating with transparent finishes, in order to display the natural design of the grain of the wood, or

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Western Hemlock—Cinderella of The Pacific Northwest Forests

By BROR L. GRONDAL*

NO T even good for a Christmas Tree!" That's what the writer was told a third of a century ago when he incautiously ventured to remark that a small western hemlock tree—the first he had seen—had a graceful appearance.

"Just a weed tree: the wood rots in a hurry and there's no market for it at all," I was told.

A few days later I met my acquaintance again. "I have just visited the Forestry Building at the university," I said. "The watchman let me in, although it has been closed since the A.-Y.-P. Exposition. There's a floor in a booth in that building. Half of it is western hemlock and half is another wood. Almost a million people walked over both halves. The hemlock floor looks almost new, but the other floor is badly worn. I thought you said that hemlock wasn't any good?"

"Yeah, I know—just the same, it's no good. Freak stunts like that don't mean a thing. Forget it. D'you ever see the Olympics across the Sound?"

Such was the writer's introduction to western hemlock. It was just a weed tree. It was valueless as an ornamental, because it shed leaves and was scraggly and unkempt. It was regarded as a poor forest tree, because when the fir was cut, loggers claimed that it blew down with the first good puff of wind. It didn't even make good, first-rate fire-spreading snags! Loggers left most of the hemlock as slash. Even on timber sales in the national forests, where the U. S. Forest Service required the payment of a small stumpage price for the hemlock that grew with the fir and cedar, most of the hemlock logs were left in the woods. Only the largest and best hemlock logs were cut into lumber, and this was mixed with "common" fir so that it could be "worked off" at little or no profit.

And today? Well, just drop in at the nearest retail lumber yard. Try to buy some

of this hemlock for flooring or shelving or for that odd job around your house.

"I know that I can't get fir" you begin, "because the army wants it for pontoons and the Navy wants it for barges. Critical material, they tell me. So, I guess I'll have to be satisfied with hemlock . . . "

"Ha, ha, ha", the retailer will say. "So you will be *satisfied* with hemlock, will you? That's a good one!" And after a pause he will say, grimly, "Well, we've got some pretty fair No. 3 common fir that maybe you can use, and some cedar. The cedar is pretty fair stuff. How much do you have to have?"

And so you ask again, incredulously.

"What do you mean? Don't you have any hemlock? I heard that fir was frozen, but hemlock—who's taking the hemlock?"

And then the retailer will patiently explain to you that hemlock is also "critical" material; that pulp mills that represent investments of many millions of dollars are shut down because they have been cut off from their supply of hemlock logs by war-demands.

And in turn you try to visualize possible war uses for hemlock. Finding it too hard a problem to solve, you decide to satisfy your curiosity, and ask "Well, what in the world is hemlock so good for, now?

And the answer comes as a stunning surprise.

"Airplanes, for one thing, mister!"

Yes, western hemlock, Cinderella of woods, has left the dance-floors, slippers (it's the *eastern* hemlock that has the slivers) and all, to fly in the sky. It is playing a big part in the winning of the war; a part that will never be forgotten.

And it's the same western hemlock, *Tsuga heterophylla* (Rafn.) Sarg. that was formerly such a "poor relation."

Years ago, it was discovered that western hemlock made good, strong boxes for canned salmon, pineapple, kerosene tins and other products, and for this lowly but important purpose, due to its cheapness, it almost supplanted spruce. Then spruce came along in the form of fibreboard boxes and crowded out the sturdy hemlock boxes; for the inferior fibreboard boxes were cheaper. But hemlock again scored a victory. It was found that this wood made the strongest "kraft"

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pulp in the world (The Swedish pulp producers who make kraft pulp from Baltic spruce and pine may dispute this statement, but it's true) and fibreboard boxes of hemlock now rule the roost.

Until recently, the pulp mills were the best buyers of hemlock logs. They paid a low price for them; just enough to entice the loggers so that they would bring them out of the woods. Regardless of the fact that hemlock flooring is superior material, and despite the fine appearance and undeniably good qualities of properly kiln-dried hemlock lumber, such material has been hard to sell. The leading lumber trade association of this region made special appropriations for trade extension activities to promote the sales of hemlock, but the results were disappointing. The public just didn't seem to care for hemlock—hemlock lumber produced in other regions had a poor reputation, and people have their prejudices.

And now, in war time, hemlock, with its rather ugly Japanese generic name, *Tsuga*, instead of being damned, is right in the thick of the battle for the four freedoms. Yes, unfortunately, "Tsuga" is a Japanese word meaning "yew-leaved." In Japan, in 1855, a visiting French horticulturist, Elie Abel Carriere, who died in 1896 at the age of 80 years, found a tree that had never before been described in botanical language. It was a slow-growing tree of good dimensions and had dark, glossy leaves—it clearly belonged to a genus of the family *Pinaceae*, but what genus? As it didn't seem to fit nicely into any of the existing genera that were listed, Carriere created a new one, and chose as a name for this genus the colloquial Japanese name for this tree, which happened to be "Tsuga". To honor a Dutch botanist, Philipp Franz von Siebold, he chose "Sieboldii" as the specific name for this tree. So *Tsuga sieboldii* Carr. became established as the correct name for the original species. It is unfortunate that Carriere didn't see western hemlock first—it would have affected the generic names of two of our principal species: western hemlock and Douglas fir!

There are no trees of the genus *Tsuga* that are native to Europe, but one species grows high in the Himalayan mountains. This tree, *Tsuga brunoniana* Carr., re-named *Tsuga du-*

mosa by Sargent or Eichler, sometimes attains a diameter of 6 feet, but is seldom more than 120 feet high. As a source of lumber, it is unimportant. In central and western China, two other rather unimportant species are found: *Tsuga chinensis* Pritz and *Tsuga yunnanensis* Mast. And jumping off from China into Japan again (western hemlock in more planes may be doing it soon), we find another hemlock which Carriere named *Tsuga sieboldii nana*. Yes, you guessed it! It's a baby hemlock—a little tree that Carriere regarded as a variety of the original species. An English botanist, Maxwell T. Masters, renamed it *Tsuga diversifolia*, after a Russian botanist, Carl Johann Maximowicz, had tagged it with the specific name of *diversifolia* but had placed it in the genus *Abies*. So now this baby Japanese hemlock has to carry both of their names, thus: *Tsuga diversifolia* (Maxim.) Mast.

But let's get back to the United States. Here we have more important hemlocks. In the eastern half of the United States, from Nova Scotia to eastern Minnesota and southward along the Appalachian Mountains to Alabama is an important forest tree that produces quantities of rather poor lumber but which also supplies great quantities of tanbark. This tree is *Tsuga canadensis* (L.) Carr. The great Swedish botanist, Karl von Linne, who originated the modern system of nomenclature used the world over in naming plants and animals, died in 1778, long before Carriere decided that all trees of this genus should be called "Tsuga," and therefore Linne's name, represented by the letter "L", must go in parenthesis! This matter of correct scientific names is pretty important to scientists!

Associated with this tree, eastern hemlock, which many botanists want to call "hemlock spruce" (foresters scoff at the idea) is another tree that has a very limited distribution in the Blue Ridge Mountains from Virginia to Georgia. This tree is *Tsuga caroliniana* Engelm. George Engelmann, who discovered this species and named it, was an American. He died in 1884. This tree is relatively small, and is not an important source of lumber.

So, to find really good, big hemlock—the kind that yields flawless veneers that can be

bent around forms without breaking, and that will make airplane parts that are exceedingly strong and yet light in weight when glued in layers with water-proof synthetic-resin glue, we must go back to our own forests in the Pacific Northwest. Here we find that our Cinderella, western hemlock, has become queen of the forest!

In the past, western hemlock has even suffered the ignominy of having a doubtful scientific name. Various authors have persistently called it *Tsuga mertensiana*. But this name is properly applied only to "Mountain" or "black" hemlock, *Tsuga mertensiana* (Bong.) Carr., which grows at higher elevations in the Cascade Mountains, and which is today becoming rather important as a timber tree as logging advances higher and higher into the mountains. Western hemlock has also been dubbed *Tsuga albertiana*. Just why, nobody seems to know. Everybody seems to have taken a morbid interest in western hemlock, much to its discomfiture.

In the trade, western hemlock has been sold, from time to time, under a variety of pseudonyms. It has been called "Alaska pine," "gray spruce," "gray fir," "Prince Albert's fir" and other names in which an attempt has been made to remove the blight of the name "hemlock," but now it is sold under its true name, western hemlock or "West Coast hemlock." The argument in favor of the last name is this: along the Atlantic seaboard, anything west of the Appalachian mountains is "western," and to people living there, "western hemlock" many mean hemlock from Michigan, or even western Pennsylvania. Therefore, it is now commonly called "West Coast hemlock" in trade promotion literature.

Fifteen years ago, it was discovered that hemlock of this region is ideal for the manufacture of the finest grades of sulphite pulp—pulp so pure, and with so high alpha-cellulose content, that it is the best material for the manufacture of rayon. Much of the rayon that is used for the finest grades of hosiery, as well as for the heavy, strong cords that are used in the manufacture of rubber tires for military vehicles, is now obtained from western hemlock. Pulp mills of this region are now turning out large quantities of western hemlock pulp used in the manufacture of the high explosives that our army and navy

are using so effectively in defending our democracy. Western hemlock has gone to war in a big way!

After we have won a complete victory and again turn our attention to peace-time pursuits, western hemlock will form a solid basis for permanent prosperity in the Pacific Northwest, for western hemlock grows very rapidly and even small trees will, in the future, command an excellent price as pulpwood. Larger trees will make fine lumber, and now that the good qualities of such lumber have been emphasized by its use in airplanes, it will be in great future demand.

Hemlock has been recognized in the eastern portion of the United States by the establishment of the Hemlock Arboretum, near Germantown, Pennsylvania, on Kitchen's Lane. Heading this arboretum is Charles F. Jenkins, of Mt. Airy Post Office, Philadelphia, who is an enthusiastic admirer of western hemlock, and has given our hemlock a place of honor in this arboretum. Plant a western hemlock in your own, personal arboretum—it is fighting today for you!

1 1 1

Note on Chestnut Blight

The chestnut blight disease, referred to by Mr. Ferris in his article, which has so thoroughly ravaged the forests of eastern United States to the extent that the native *Castanea dentata*, Borkh. has been eliminated for all practical uses, found its way into the Northwest many years ago. The fungus was reported from the University campus just prior to the outbreak of World War I. However, today there are no apparent signs of its presence, a fact which may be explained in two possible ways, namely, that either the early attempts at eradication were completely successful, or that the cool, humid environment of the Puget Sound region was not amenable to the disease organism. As long as it is not now here we should do everything possible to keep it away. New stock brought into the region should be subjected to closest scrutiny by experts.

1 1 1

Of more than passing interest at the Arboretum during May was a group of silver-bell, *Halesia carolina*, L.

The Cascara, a Northwest Tree

By FOREST J. GOODRICH*

OUT of the fifty or more medicinal plants native in this state, probably no single one has attracted more attention from a commercial standpoint, than the *Cascara Sagrada*. The tree has more than a special interest, since its bark has been collected for medicinal purposes for many generations. It is a beautiful, symmetrical tree and is known to the Indians as the "Sacred Tree," or "Sacred Bark," from which it gets part of its name.

The plant is native only to the Northwest, having for its boundaries Northern California on the south, and approximately the Fraser River to the north, the Cascade Range to the east, and the Pacific Ocean as its western boundary. In this rather well defined area it can be found growing under varying conditions. Much of this territory is unsuitable for cascara, while in certain parts the trees grow most abundantly. Due to distribution of the young plants, cascara may be found in arboreums and growing in certain other parts of the country. Because of their beauty and fairly rapid growth they have been transplanted as ornamental trees in other parts of the country where climatic conditions favor their growth. The trees, however, are strictly indigenous to the extreme West.

The most important species of the genus *Rhamnus* is *Purshiana*. In Southern Oregon and Northern California *Rhamnus californicum* grows in large quantities. As a matter of fact, a considerable amount of this latter species has been put on the market as a substitute or adulterant. Several other species are now being cultivated in the University of Washington, College of Pharmacy Drug Garden. However, only the one native species is of any importance from a medicinal standpoint.

The name applied most commonly to the cascara bark is chittam bark, or chittam wood. As mentioned previously it has retained the synonym "Sacred Bark." It is often incorrectly called buckthorn, because this name is applied to *Rhamnus frangula*. Bearberry and bearwood are two synonyms which are in common use and should not be used because of confusion with other plants.

*Dean, College of Pharmacy, University of Washington.

Cascara trees often reach a height of fifty feet or more and a circumference well over two feet. Trees of this size are not commonly found, due to the fact that the bark has been peeled from easily accessible trees for a long period of time. The tree grows erect with its branches upright when grown in the forest, and often its lower branches are twelve to fifteen feet from the ground. If the trees are planted in the open, they have a tendency to become very broad and do not attain as much height. Flowers appear in the early spring and are born in clusters toward the end of the spurs or branches. The fruits, when fully mature, are between a quarter and a third of an inch in diameter. The green fruits turn to red and ripen in the Puget Sound area in late July. The fruits are eaten by birds and no doubt a great deal of seed is distributed in this way. The bark will vary in thickness depending upon the age of the tree. Green moss is frequently observed, particularly if the trees are found in dark, moist situations. The inner surface of the bark, when freshly peeled, is a bright yellow color and darkens rapidly on exposure to the air. It is extremely bitter to the taste, almost to the point of nausea. This is the portion which contributes the important medicinal agent.

The trees are comparatively free from disease. The oyster scale blight has been found on some plants, but has not done any serious harm to the growth in general. A small, green aphis is found in some areas, where they feed upon the leaves, but they are not found in all regions, nor are they doing any material damage to the crops. We are fortunate in that the trees can be considered as fairly free from disease.

Ideal conditions for the cascara are found in the deep, rich, sandy or humus soils in the river bottoms or areas adjacent to running streams. The soil should be well drained and the species prefers some natural shade. If the trees are grown in the open, or dry, gravelly soil, they remain shrub-like and do not make appreciable growth. Seedlings are found in comparatively heavy growths of other trees, but make little progress until more light reaches them. Based upon this fact much of the finest cascara is now obtained from logged-off land. Growth is fairly rapid,

often attaining two-fifths of an inch increase in diameter per year. Trees of five-inch caliper frequently are found to have ten to twelve annual rings. The writer believes that the trees can be grown on logged-off land on a profitable basis, provided suitable conditions are available. On one particular tract, that was logged several years ago, some 2,000 trees have been planted. Although the site is not ideal for the plants they have, nevertheless, given a good growth. The planting distance was eight by eight feet and no cultivation was attempted. Although they have been allowed to compete with the other vegetation, the present rate of growth indicates that only 10 to 12 years will be required to bring them to sufficient size for marketing.

The bark from the cascara tree should be removed during the period from April to September. It is not feasible to peel during the cold months, since the bark will not strip off readily. After peeling, the bark is dried by exposing it to the sun on open platforms or in protected areas. It is sometimes dried in warehouses where good ventilation is provided. After drying it is put through a hopper to be crushed rather coarsely, and then sacked.

The peeling is done by taking the available bark from the trunk and the heavier branches. Collection is made by professional peelers or itinerant collectors, usually on leased property or on land where no restrictions exist pertaining to its collection. Obviously the trees will die after they have been peeled and the correct way to accomplish the task, therefore, is to cut the tree down at the start, making certain that the bark on the 6 or 8 inch stump is not injured. This will permit new growth to take place from the root, thus insuring continuous growth from sprouts which form there. To insure plenty of cascara, the bark should always be obtained from fallen trees, as it is also possible to obtain a major quantity from the whole tree, including the smaller branches.

Washington, in the past, has had no forest law to protect cascara against trespassing and uneconomical peeling. No apparent shortage of cascara exists at the present time but no doubt the supply will be seriously curtailed if some means is not furnished for proper protection of the trees. It is gross waste both to peel trees less than three inches in

diameter and also to remove only the easily obtained bark from them. Measures should be enacted to insure a continuous supply of this important medicinal tree.

The people of the Northwest should be very jealous of the cascara, as it furnishes the bark which is widely used in medicine. It is one of the more dependable vegetable cathartics and is used by the public in many parts of the world. Synthetic laxative drugs have been introduced into medicine, but, nevertheless, cascara has continued to compete successfully with all of them. Also, besides its service to the health of the people, there is no lovelier tree grown in our gardens and our forests than the *Cascara Sagrada*.

* * *

Interesting Small Tree

There is just coming into full bloom at the Arboretum, a very promising ornamental, a member of the legume family, known as *Cytisus Battandieri*. It is the more interesting because, though native of North Africa, it was not affected in the least by the severe cold of last winter. Not a branch or a bud was damaged and right now the heavily-flowered, medium-long, erect spikes of rich, golden blooms are bursting forth. The single plant is very neat, though the crown is quite open and loose. It certainly seems to have important potentialities as an ornamental, either to supersede or to supplement the golden chain tree (*Laburnum anagyroides* Med.). It blooms later than laburnum, has a cleaner form and is also of just about the right size for the small home grounds. In addition, its flowers are quite fragrant.

The tree can be seen alongside the upper roadway, adjacent to the Eleanor Roosevelt elm, at the crest of the slope just south of the main entrance into the greenhouse yard.

* * *

Pinus Pinaster, Art., the cluster pine or maritime pine, native to the coastal regions of the Mediterranean country, withstood the severe cold of the winter in perfect condition —then it was blown down by the big wind of late April.

*Some Ornamental Trees and Their Uses**

By JOHN H. HANLEY

AS AMONG the four general classes of ornamental plants that are used to beautify homes and cities, *e. g.*, the annuals, herbaceous perennials, shrubs, and trees, the latter two are the most abused by far. Gardeners are wont to expend their complete energies upon the lawn, the rockery, the perennial border, or the annual garden, undoubtedly considering that the larger, more robust woody plants are better equipped to withstand carelessness and to take care of themselves. To a certain degree it is true that trees and shrubs are more capable of surviving, once they have become thoroughly established, without the detailed care that is required for the successful culture of many herbaceous species. But this is true only up to a certain point. Beyond that point it becomes necessary to apply certain fundamentals of care to both trees and shrubs if they are to appear at their best.

Most people recognize the value of neatness and good arrangement in the landscaping of their homes and cities. The atmosphere of the home, the atmosphere of whole communities, is influenced in an important way by the amount of time and thought and energy applied to the landscaping and to the maintenance of public and private grounds.

An important relationship exists between the landscape plan and the subsequent maintenance of the plantings that are made. One must never consider that the landscape picture is complete immediately following the planting, no matter whether the design was drawn up by a prominent landscape architect or whether it was the product of the gardener's own effort. The final effect, the desired effect, will be determined entirely by the amount of care that is given to all of the component parts—the trees, the shrubs, the perennials, the annuals, and the lawn. As between any two gardens, the one designed by a landscape architect but carelessly maintained, the other without design but immaculately cared for, most of us would get greatest joy out of seeing the latter.

Soil Preparation Important

The care of trees really begins before they are planted. The soil should be thoroughly prepared in advance. Heavy soils should be made lighter by the addition of organic matter and sand. Drainage should be provided so that water does not stand about the roots, particularly during the winter months. Light, sandy soils, although they are much better to begin with than the heavy clays, should also be worked over, at least to the extent of incorporating plenty of organic matter in them, and sometimes even to the extent of adding quantities of clay if they are too sandy. Drainage is not usually an important problem in these light soils unless they are shallow, with a clay hardpan close to the surface.

Old world gardeners seem to appreciate the importance of adequate soil preparation more than we do. It is not uncommon to find them working the soil to a depth of three feet prior to placing the plants in the ground. Such a practice is especially good in those regions where the summer season is dry. Tree roots can penetrate deeply and the added organic matter tends to hold more water, with the result that the plants are better able to withstand the adversities of summer drought. Mr. Herbert Ihrig, one of the Northwest's best rhododendron authorities, also lays great emphasis upon this point in getting ready to plant rhododendrons. He even goes so far as to recommend that a large excavation three feet deep be made for each one and that into the bottom there be placed ample quantities of leaf mold and peat. His idea is to supply an actual reservoir of water upon which the plants can draw during dry periods.

When the soil is properly prepared both trees and shrubs grow more rapidly and become more vigorous and healthy. A vigorous, healthy growth brings greater freedom from insects and diseases. A case in point has been reported from Eastern United States where, in some sections, the American elm has been attacked severely by the Dutch elm disease. It was discovered that the disease organism, a fungus, was being spread by bark beetles which flew in swarms from infected trees to non-infected ones. It has been declared by some of the men, who studied the progress of the disease, that the bark beetle

*Revised from *The Washington Alumnus*.

carriers most frequently chose *unhealthy, weak* trees in which to alight and leave the fungus spores.

Factors Influencing the Choice of Tree Species

Tree species exhibit a wide range of characters which can be used to determine what particular one should be planted in this or that location. Along city streets and around the average home there may also be physical factors which will tend to limit one's choice. For example, when considering the matter of tree planting along streetways as a part of any scheme of city beautification there are these two points which should be borne in mind, (1) the uniformity of the types of trees to be used, and (2) the location of the telephone and electric light wires.

As to point number one, a very fundamental concept is involved. Whether a given street, or even a whole city, presents a good or a bad appearance will often be determined by the uniformity or the lack of uniformity, respectively, that is evidenced in the tree plantings. What is meant by lack of uniformity can be readily appreciated by mentioning a condition that is too frequently encountered. The parking in front of one house is planted with two elms, the next has two catalpas, then one encounters two birches, two poplars, two hawthorns, and so on. Such a series can easily be found in any city which lacks a unified plan. Contrast this situation with that found elsewhere—a cool, shady street lined on each side with graceful, arching elms; another with beautiful white-barked birches over its entire length; another with vigorous, colorful flowering cherries. These truly beautiful effects are not achieved haphazardly. They come only as a result of intelligent planning and unified effort.

As to the second point above, *i.e.*, the location of utility wires, one merely accepts the condition as it exists and makes the selection of the tree species to fit the situation. Where telephone and light wires follow along the sides of the street, above the parking strip, the worst possible trees to use are those which grow tall, necessitating the removal of large portions of the upper crown after the first few years. This unsightly condition can be seen in many cities and towns, throughout the

State of Washington, wherever rapidly-growing, tall trees such as the soft or silver maple, have been used. It is far better under such circumstances, to choose small types of trees which do not grow tall enough to interfere with the wires above.

Of course, a proper solution to the problem of locating utility wires would increase the numbers of tree species from which to choose and would enable city beautification to be accomplished much more satisfactorily and quickly. In most young communities one finds the telephone and light wires carried along the streets above the parking strips. But as the communities mature, as age, and thought, and intelligent planning enter and develop in them, a movement to relocate or to completely eliminate such utility features always develops. It stems from a desire to present the city or town in its best possible light, to make it beautiful, to give it proper character. The first step, in affecting the change, is to place all utility poles on alleyways between the streets, at the rear of the homes. The second step is to place all utilities underground. No modern, alert community should allow utility features to be placed along streetways and they should begin the prohibition immediately wherever and whenever a new section or development opens up. Furthermore, every community should encourage utility companies to adopt the more modern methods in all sections of the city, both old and new.

So far as the selection of tree species for use around the home is concerned, there are a few general considerations that deserve attention. One should choose types which blend harmoniously into the landscape picture. Most of us have rather small home grounds. The average city lot is definitely small. This size factor should influence our selection at least to the extent of using *fewer* tree types and of choosing the *smaller* tree species in preference to those which grow rapidly to a large size. The tremendously large trees tend to dwarf all their surroundings, particularly the house structure itself.

Shrubs Not Too Varied

The choice of shrubs is attended by fewer limitations. The gardener will always buy and plant those kinds which have an especial

appeal to him or to her. There is one principal point to be borne in mind—do not use too many *different kinds* of shrubs in a small space. It is possible to achieve a much more attractive planting by using *fewer kinds* and *more of each kind*. All of us have seen foundation plantings in which as many as ten or twelve *different* shrubs have been grouped along the front of a house—one of each kind.

Ordinarily the appearance of such a planting could be improved by eliminating all but one or two or possibly three *kinds* of shrubs and adding more plants of the one or two or three kinds. If this practice was put into general use, there would be a marked improvement in the appearance of many homes.

Selected Lists of Trees

Among the tree species one can find types that are excellent for both public and private plantings in all parts of the State of Washington. Of course, there are many other, less adaptable forms which must be used where the climatic conditions are less severe. The remainder of this article will take the form of two brief, descriptive lists of various types of trees. Each species has some particular attribute which makes it worthwhile. In order to make the lists valuable to people both east and west of the Cascades, the words "East", "West," or "East and West," appear in each description. "East" shows those hardy in Eastern Washington only, "West" indicates those which should be used only in Western Washington and when "East and West" are shown the tree can be grown both east and west of the Cascade mountains.

1. Selected list of tree species which can be used to good advantage along those streets or around those homes where small types are needed:

Acer campestre—the English Hedge Maple. Tree to 25 feet with a broad, dense, rounded crown. East and West.

Albizia julibrissin rosea—the Silk tree. A beautiful, broad-crowned, lacy tree to 30 feet. Bright pink flowers. West.

Amelanchier canadensis—the Downy Shadblow. An early-flowering tree to 30 feet. White clusters of flowers in early spring. East and West.

Aralia elata—Angelica Tree. A small tree to 25 feet with large, compound leaves and beautiful clusters of white flowers in summer. West.

Cercidiphyllum japonicum—the Kadsura Tree. One of our most beautiful ornamental trees.

The heart-shaped leaves turn to brilliant colors in the fall. 30 feet. West and possibly some sections East.

Cercis canadensis—American Redbud. A small species, to 20 feet, which covers itself with pink, pea-like flowers in early spring before the leaves appear. West and possibly many sections East.

Cercis chinensis—Chinese Redbud. An oriental counterpart of the American form. A very handsome tree with flowering characters similar to the above. 30 feet. West.

Chionanthus virginica—White Fringetree. Although slow-growing, this tree will reach an ultimate height of 25 feet. Very beautiful in bloom with its lacy panicles of white. East and West.

Cladrastis lutea—the Yellow Wood. A clean, attractive type belonging to the legume family. 30 feet. West and possibly many areas East.

Cornus florida—Eastern Dogwood. A slow-growing tree to 25 feet. Excellent for flower effects in spring and foliage colors in fall. A pink form, *rubra*, is available. East and West.

Cornus Nuttallii—Western Dogwood. An excellent species for use on the drier sites west of the Cascade mountains. Both spring and fall-blooming types can be found.

Crataegus oxyacantha—English Hawthorn. A beautiful small tree to 25 feet. It is graceful in its growth habits and flowers abundantly each spring. White, pink and red forms are available. East and West.

Diospyros virginiana—the American Persimmon. An interesting tree to 25 feet producing striking fall foliage effects and edible fruits. East and West.

Elaeagnus angustifolia—the Russian Olive. A small tree to 25 feet that is particularly good for its silvery foliage. East and West.

Halesia tetrapeta—the great Silverbell. A particularly fine, slow-growing tree that covers itself with masses of white, hanging, bell-like flowers each spring. As age advances the trunk takes on interesting gnarled, twisted effects. West and possibly many sections East.

Laburnum anagyroides—the Golden Chain Tree. Hardy west of the Cascades only, its long, pendulous racemes of clear yellow flowers, produced in great abundance, make it one of our most desirable small trees. 25 feet. West.

Magnolia soulangeana—Saucer Magnolia. This species, with its numerous varieties, provides especially colorful displays of large flowers in early spring before the leaves appear. East and West.

Oxydendrum arboreum—Sour Wood. A beautiful small tree from the Appalachian mountains. It is particularly good for fall color effects. 25 feet. West.

Prunus serrulata and its varieties—the Flowering Cherry. The introduction of many brightly colored, double- and single-flowered forms has added many types to the number that are adaptable for street and small home use. 25 feet. West.

Sassafras variifolium—Sassafras. A beautiful small tree especially if one procures a form

(Continued on Page Twenty-Seven)

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ARBORETUM FOUNDATION OFFICE HOURS

9 a. m. to 12 noon—Monday through
Friday.

The Tree Issue

THE bulletin committee of the Arboretum Foundation has decided to concentrate on some particular group of plants, or on a Northwest industry based upon a particular group of plants, in each ensuing issue. At this time we are presenting material relating exclusively to trees and to the lumber industry.

The development of the Pacific Northwest has been dependent upon its forests and its shipping. At the present moment a tremendous business expansion is growing out of the many defense industries with the result that lumbering and shipping seem less important. But the time must surely come again when our dependence upon them will return and they will be generally recognized as the mainstays of our economic life.

The history of many once wealthy regions, which relied upon logging, is tragic. Ghost towns and a completely decimated countryside have followed too often in the wake of the lumberman. A stable, permanent forest industry is what the Northwest must have and stability is the very factor which so many logging areas have lacked. Fortunately, the execution of well-laid forestry plans in other parts of our country has demonstrated that stability can be achieved, especially in regions where the re-establishment of the forest cover can be accomplished easily and quickly. The Northwest is one such region and the present estimated regrowth on many logged-off areas is a most encouraging omen. Also encouraging is the far-sighted, energetic forestry program which is being carried out, not only on federal and state lands, but on the holdings of private companies as well.

A perfect example of the position of the latter group is seen in the new forest nursery that has been installed in the Nisqually flats, south of Fort Lewis by the West Coast Lumbermen's Association, and the Pacific Northwest Loggers' Association. The three million forest tree seedlings that will come out of this nursery each year will be used for replanting private lands. Yes, the lumberman, too, is looking at the future optimistically.

One of the purposes of the Arboretum must be to assist in the development of a stable economy in so far as our efforts can be directed along those lines without upsetting our other major purpose of establishing a beautiful and a complete collection of well-maintained, ornamental trees and shrubs. The Arboretum has at long last received substantial help from the state in the form of a biennial appropriation which is now being used to build up a previously depleted labor force. We are just now beginning to catch up with a few of the most important maintenance details. The work program calls for thorough cleaning operations along Lake Washington boulevard, in the rock garden, in Rhododendron Glen, along Azalea Way, in Woodland Garden, and in the lagoon section just outside the Broadmoor gate. For the time being the acquisition of new plants, as well as the work in the greenhouses and nursery, will be held to a minimum.

* * *

Arboretum Yellow Iris

ARBORETUM Foundation members who did not attend the annual meeting missed the spectacular display of the "Arboretum Yellow" iris. This outstanding flower has received much enthusiastic comment and people are still anxious to learn how to obtain it.

A prominent Foundation Board member and well known horticulturist is offering a plant, (not a division and subject to availability) plus 1 dozen of *Meconopsis betonicifolia Baileyi* (the famous blue poppy of Tibet) to each \$10.00 or more Arboretum Foundation membership, or to those members raising their dues to \$10.00 or more.

This is the only way to obtain "Arboretum Yellow" as it is not in the commercial trade and if it were it would cost at least \$25.00.

Among Our Contributors

DEAN HUGO WINKENWERDER, of the University's College of Forestry, needs no introduction to the citizenry of the Northwest. He has been for many years a leader in practically every important move directed towards the stabilization of the lumber industry at a high level. There is no doubt about the future of forestry in the great and important Northwest. Federal and private practices are moving ahead rapidly with the idea of establishing aggressive, farsighted, policies upon which the foundation of a vital, permanent business can be built. Dean Winkenwerder will always be in the vanguard of such a movement.

For an inspiring discussion of forestry and lumbering we direct you to Professor Bror L. Grondal, also of the College of Forestry at the University of Washington. Professor Grondal has always brought to his work in forest products a keen perception of the two aspects, (1) what is being done and (2) what can be done. To hear him discuss the many facets of problems involved, and others solved, is like getting a stimulating shot in the arm. He is a true forester's forester and we are proud to present his paper on the heretofore maligned hemlock of our Western woods.

Professor O. H. Schrader of the University's College of Forestry is a newcomer to the pages of the BULLETIN though much of his life has been spent in close association with the forest products field in the Northwest. Although he has but recently received his doctorate from Yale University, he has already made several important contributions to forest research. You will recognize a welcome freshness in his paper on the future of forestry in the Northwest.

The Japanese would deal a heavy blow to industry and morale in the Northwest if they could successfully consummate a program of sabotage by fire in our extensive forest tracts. Unfortunately, we, the citizens and operators, have been guilty, through the years, of unintentional sabotage arising from carelessness in the handling of fire in the woods. Visitors to the Northwest are always dismayed, as we

should be, when they encounter our vast acreage of scarred, burned-over lands—vast acres that are not coming back to forest growth because we have permitted fire to kill seed trees and young reproduction—vast acres which would now be clothed with dense forest stands had we but kept fire out. Another fire season is approaching and we appreciate the opportunity of reminding you all again of your obligations. For the final authority on the subject we have turned to the able, enthusiastic head of the Washington Forest Fire Association, Major Charles S. Cowan. We hope you will digest thoroughly the thoughts he has expressed on the subject of forest fire control and what it means to the future economy of the Northwest.

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SPECIAL NOTICE

To keep memberships in the Arboretum Foundation in good standing, dues should be paid during the month payable. A new system has been established at the Foundation office, whereby memberships payable over three months will be dropped from the active membership rolls and the BULLETIN will be discontinued.

Observations on Nut Trees

By HIRAM B. FERRIS

THE American heritage of nut tree species is quite rich. When the first settlers came to this country they found native nut trees in abundance. In the hardwood forests were the black walnut, the butternut, several varieties of hickories (including the pecan), the chestnut, and many varieties of hazels. Nature had not only supplied some which were much better than original types from the Old World, but also had provided many more kinds than were found there.

Until later years little attention was paid to these valuable trees. The forests were generally cut down and often burned to get the land cleared for farming. But in the last thirty or forty years a great deal has been accomplished in the selection and propagation of the better varieties of the many species. When we consider what has been done in the Old World, through many centuries of cultivation and breeding and starting with inferior wild nuts, we can point with considerable pride to the pecan orchard of the South, the development of which has been accomplished in the last two generations. Sargent says of the English (Persian) walnut, which we all know is so good and tasty: "The nut of the wild tree is small, with a thick, hard shell and a small kernel and is scarcely edible; but centuries of cultivation and careful selection have produced a number of forms with variously shaped thin shells, which are propagated by grafting and budding."

Along the Pacific slopes of the Cascades, on the west side, are found many nut orchards of varieties of the Persian walnut and the filbert. We have few if any orchards of these two kinds on the east side, as most of the varieties are not hardy enough for this region.

The native, wild, American nut species should be of interest to all of us. We have the black walnut, butternut and several varieties of the hickories, including the pecan, all of which are easily grown and are hardy in practically every region in the United States. The planting of these in commercial orchards might be considered by some as more or less of an experiment as yet. Aside from the orchard planting of nut trees, their value for ornamental planting should be considered. Nothing could be more beautiful for land-

scape use than the black walnut, butternut, hickory and pecan, compared with the elm, sycamore, box elder, locust and maple. Besides their beauty, the nut species have the additional value of producing edible fruits. Many of them also yield valuable timber.

Black Walnut

The black walnut is native to the region extending from the Atlantic coast west to Nebraska and from Minnesota south to the Gulf states. The nuts of the wild type are hard to crack and the kernels are more or less difficult to get out of the shells, but varieties have been developed that are thinner shelled and from which the kernels can be removed easily in full, fat halves and quarters. The flavor of the black walnut kernel is particularly fine. It is not lost in cooking and is therefore a great favorite with candy makers and bakers. Those of us who grew up with these trees will never forget the high quality of the fruits.

Great progress has been made in the search for better varieties of this tree by the members of the Northern Nut Growers Association. By budding and grafting from these better trees the finer qualities are maintained.

The timber value of the black walnut is another important feature well worth considering. Sixty- and seventy-year-old trees have been sold for \$80 and \$90 for their lumber, and older trees for more. This feature should be considered for the future generations, perhaps. Also, experiments which have been made to induce the formation of burls on the black walnut are said to have been successful. Those of us who have seen the redwood burls can well imagine the possibilities with the walnut in this regard. Some eighty years ago a homesteader in the south part of Spokane County planted two considerable groves of trees on his land for wind-breaks. He used elm, maple, willow, birch and box elder with some conifers. If he had planted black walnut trees, the timber value would have been greater than the whole farm.

The butternut tree is sometimes called the white walnut. It is hardier than the black walnut, growing wild as far north as Ontario, Quebec, and other parts of Southern Canada. Trees bearing better grades of nuts have been found and propagated by budding.

The Hickories

Sargent lists fifteen species of hickories, twenty-two varieties from a botanical standpoint and seventeen hybrids. The king of the hickories is without doubt the pecan. Most everyone thinks of the pecan as a Southern nut, but it is found growing wild in Iowa, Illinois, Indiana and Ohio, and a few scattering trees along the Mississippi River in southern Wisconsin. The results of the search in the wild forests of the South for finer varieties have been very remarkable. The large, thin-shelled nuts are quite a feature in our markets. These finer varieties have been propagated and a large industry has been established. In the search through the forests in the northern states varieties of the pecan have been found that are also quite outstanding. They are larger, thinner shelled and produce kernels of excellent flavor. The propagation of these better varieties is proceeding rapidly.

It is interesting to know that Thomas Jefferson once wrote about the pecan, calling it "the Illinois nut." He gave some of the seeds to Washington and trees from these nuts are said to be growing at Mt. Vernon. The pecan trees growing there are quite old and are wonderful examples of this beautiful tree.

Chestnut

The American chestnut was one of the outstanding nut trees of the Eastern United States until the chestnut blight destroyed virtually the entire stand. It may be possible to introduce the species into other non-infested areas, since there are several American chestnut trees growing in Spokane County. But great care must be exercised to avoid introducing the blight. Chestnut trees are excellent ornamentals.

Filbert

The filbert is the imported variety of the hazel family. The wild hazel is a common nut growing in many parts of the United States and Southern Canada. The climate and other conditions west of the Cascades around Puget Sound and up the Willamette Valley in Oregon seem to be particularly suited to its growth and large commercial orchards have been planted. Without doubt our scientific American farmers are producing the best filberts in the world.

Only the hardier varieties are planted in this region east of the Cascades. Several years ago one bush, growing in Spokane, produced two to three gallons of shelled nuts each season. In the orchard the filbert is grown as a tree. Some of the varieties, such as the purple leaved form, are grown particularly for ornament. Even the green-leaved form will make a most beautiful hedge. Why not have a productive hedge, one that would produce fruits of fine quality, in place of the more usual barberry, privet or the like?

English Walnut

Another imported nut tree, the Persian (so-called English) walnut has been grown successfully on the west slope of the Cascades. The orchards are a truly remarkable sight along the highways. In order to facilitate more widespread use, several hardier varieties of the Persian walnut have been imported from the Carpathian Mountain region of Poland and Czechoslovakia where the thermometer reaches 40 and 50 degrees below zero, remaining so for a month or more at a time. Thus the possibility of using this species in the colder regions is very encouraging. It is a highly ornamental tree and, as grown in the Carpathians, produces a high quality of nut. The famous Circassian walnut lumber is said to come from it. Whether the Carpathian form, when grown here, will produce the same grade of highly prized lumber remains to be seen.

Practically all these nut trees, walnuts, hickories, pecans and filberts, are quite easily grown. They will do better when mulched as young trees and where the ground is kept fairly moist for the first few years. They have a long tap root which is an advantage in home planting, as the roots grow more deeply under the surface and do not interfere with lawns and other plantings. Two or more trees should be planted fairly close together so that they may pollinate each other. The horticulturists explain that most nut trees are dichogamous, which means that the pistils and stamens mature at slightly different times. It is, therefore an advantage to have several trees in a group in order to assure better fertilization. Also, for pollination purposes, it has been found that the planting of two varieties of fil-

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Douglas Fir

By JOHN H. HANLEY

IT IS gratifying to read in Professor Grondal's article, presented elsewhere in this issue of THE BULLETIN, that the western hemlock (*Tsuga heterophylla* (Rafn.) Sarg) is assuming importance in the lumber industry. Also, all of us who are familiar with the forests of the Northwest know that both the western red cedar (*Thuja plicata*, Lamb.) and the western yellow pine (*Pinus ponderosa*, Laws.), will always play a significant role in the timber business of the region. Granting the truth of these two statements we must, nevertheless, concede that the principal timber tree of the Northwest forests has been, and will continue to be, the Douglas fir (*Pseudotsuga taxifolia* (Poir) Britt.), unless, of course, the species is completely eliminated by some such calamity as that which struck down the eastern chestnut. Barring this, we will continue to regard Douglas fir as the backbone of lumbering.

Throughout this region there are tremendous logged-off areas, once productive of prime fir logs, which have not been permitted to regenerate properly to *any* timber species. The explanation, almost without exception—carelessness with man-made fires or inadequate protection against those started by lightning.

The problem of regeneration on such devastated tracts is one of planting—placing in the ground young, strong seedlings that have been grown in forest nurseries. The problem in the forest nursery is to produce the healthiest possible seedlings, in vast quantities, in the shortest possible time. As an example of the quantities of good seedlings that can be used, take the case of the new forest nursery established by the joint conservation committee of the West Coast Lumbermen's Association and the Pacific Northwest Loggers' Association, in the Nisqually flats just south of Fort Lewis. It is being geared to produce three million coniferous seedlings *per year*, the bulk of them Douglas fir.

The development of sturdy, strong-growing seedlings of Douglas fir in any such nursery will depend upon the care they receive and upon the cultural methods practiced; it will depend, in other words, upon the creation of

an optimum environment. That, too, is the nurseryman's problem.

But there may be an even deeper, more fundamental problem that is not at all dependent upon environment. To illustrate: Suppose you plant a handful of grapefruit seeds in a shallow pan of soil in your home. Some of the seedlings show the normal green color, others are white; they lack vital chlorophyll; they are albinos. The albinos live only until the stored food, within the seed, is used up, and then they die. What caused the difference between the green and the white plants? Was it the environment? Suppose you now plant a handful of seeds of the red-flowering currant (*Ribes sanguineum*, Pursh.). You are careful to handle the seedlings in the same way; you use the same kind of soil and plant them carefully in uniformly good soil in your garden. Some produce light pink flowers, others medium pink, others very dark pink; some become tall, lanky shrubs, others are shorter, more compact bushes. What caused the differences—environment? Or suppose you plant a handful of seeds of the western dogwood (*Cornus Nuttallii*, Audub.). When the young trees reach flowering size you find that some of them bloom in the spring, some in the fall and others produce a moderate quantity of flowers in both the spring and the fall. What caused these differences? Environment?

The Douglas fir itself gives us the best example to illustrate the point that is being developed. A number of years ago a group of German foresters visited the United States for the purpose of collecting seeds of many forest tree species. Among the species from which seeds were taken was the Douglas fir. But the Germans were not content to take seeds from fir trees here, there and everywhere, nor did they lump them all together in one container. They kept the fir seeds from different localities separate and they collected from many different localities. These seeds, when planted in Germany, gave unequal results. Those from some regions grew into husky, strong seedlings; those from other sections gave inferior seedlings. As a result of that simple test, whenever Douglas fir seeds were thereafter ordered for use in Germany, the order always specified the exact region from which the seeds should be collected. What caused

these differences in the rate of growth and vigor? The environment where the seedlings were grown in Germany?

In every case the answer to these questions is, no! The differences are due to something inside the plant, inside the seed itself. They are hereditary differences, just now coming to be recognized properly by practical foresters.

As has been previously reported, studies made on Douglas fir trees in the Fort Lewis area indicate that there are a great many variations, appearing regularly, which cannot be explained by changes in environment. To be sure, most of these differences are external; they are individual characteristics that can be easily recognized by eye; they are largely differences attendant upon habit of growth.

So far as habit of growth is concerned it is not difficult to find them. They run from an extremely pendulous form with a corkscrew trunk (the branches bend down almost vertically and lie along the trunk), through several intermediate grades which display varying degrees of pendulousness, to semi-erect, erect and near-fastigiate types. The extreme forms are, of course the most interesting. One particular tree with a twisted, gnarled trunk and very pendulous branches is outstanding. It departs so far from the normal that it is improbable that one who has not seen it close at hand would recognize it as being a Douglas fir from even a short distance.

The other extreme type, erect-fastigiate, is not frequently encountered; one near-fastigiate tree has been found and is being propagated. This particular tree is a beautiful specimen. The branchlets are ascending, stiffly rigid, and clothed with short, stiff, radially-spreading needles. The crown is rounded, full, and bushy, forty feet tall and almost as broad—a thoroughly magnificent tree, lacking entirely the characteristic looseness of crown found in the type and showing very little tendency toward the usual two-ranked arrangement of the needles.

Other characteristics that are being observed are rapidity of growth, propensity for natural pruning and seed viability. This study relates to the selection of strains for lumber purposes. Thus far we have no direct evidence that there are strains which show different abilities to prune themselves naturally. There are merely *indications* that point to

certain possibilities along this line. The object of selections made on this basis would be to develop strains which would produce clearer, hence higher grade, lumber. So far as seed viability is concerned, germination tests have disclosed that seeds collected from certain parent trees give markedly better germination than others. This again is more closely allied to commerce than to landscaping and it indicates the desirability, on the part of governmental agencies in particular, to make more careful selection of parent trees when seed is being collected. Of course, the next step in this direction is to discover which trees produce the most vigorous seedlings. This test follows naturally with the experiments on seed viability.

From all of these tests it is hoped that, in time, there will come one or more strains of Douglas fir which can be used to reforest logged-off lands and which will grow to maturity more rapidly than seedlings grown from seeds which have been collected indiscriminately. The experience of the Germans, added to our own evidence, supports the contention that genetic variation does occur, and both lend hope for a successful culmination of our endeavors along these lines.

* * *

Wind Damage During the Spring

A most peculiar form of damage, apparently the result of unfavorable atmospheric conditions, has been prominent among several types of ornamental trees. It first appeared on the deodar cedars, the young, partially expanded leaves of which were dried to a crisp brown to the extent that the south and southwest faces of many of the trees appeared to be dead or dying. The condition was particularly prevalent on exposed specimens; protected trees showed no appreciable damage. During the six weeks that have followed the heavy windstorm, some of the damage has been repaired by the growth of new leaves and, from all observations to date, no trees will be completely killed or even permanently affected. Native maples, Japanese maples, willows and flowering cherries were also affected to a lesser degree. There is no need for alarm if some of your trees are among those that were damaged. The chances are good that recovery will be quick and virtually complete.

Summer Activities in the Garden

By JOHN C. SNYDER
Extension Horticulturist

NO two garden seasons are exactly alike. Some start out with warm weather in late February continuing through March, April and into the summer. Others are cold and rainy up until June with good gardening weather scarce. Whether the spring is early or late need not be of much concern to the home gardener who has prepared his soil well and planted his seeds on time.

Late, cool springs are ideal for cool weather crops such as spinach, lettuce, radishes, carrots, onions, beets, cabbage, green sprouting broccoli and peas. During such springs these vegetables are available from the garden during a longer period than usual. Gardeners who are fond of these cool weather crops in reality are favored by late springs.

Early springs on the other hand usually mean that fresh vegetables can be obtained from the garden earlier than usual. This is particularly true of warm weather crops such as beans, corn and tomatoes. It does not mean, however, that during early springs gardeners should plant these crops much earlier than usual. Too frequently they are injured by late frosts when planted too early.

Because good results may be expected from home gardens, whether the spring is early or late, no effort should be spared in giving the garden crops a good start during seasons of late springs such as the one we're now experiencing. To care for gardens as they should be may test the faith of inexperienced gardeners.

Weeding

Weeds have no plan in the garden except that a few of them, such as lamb's-quarter and dandelion, may be used for greens. It is not as though they were to be feared like a rattlesnake, but that they look out for themselves at the expense of our garden crops. They're first offense is stealing moisture. During dry seasons this is particularly serious and, as might be expected, stunting the young seedlings as they are becoming established influences them for life.

If these "moisture thieves" take moisture they also take foods needed by the vegetables. To eliminate these foods is quite serious be-

cause the young seedlings usually do not have any to spare when they are just getting started.

Victory gardeners, then, should get the weeds early. Fortunately weeds are easy to kill when young. It is much better to keep ahead of them than to let them get ahead of you.

Cultivation

Start cultivating your garden as soon as you can see the rows. Cultivating keeps weeds down, makes plant foods available and helps to warm up the soil. It is not necessary to cultivate to a depth of more than one or two inches. Cultivation should be as frequent as necessary to keep the weeds down and to keep a crust from forming on the surface of the soil.

Thinning

As soon as the young seedlings become well established, thinning may be started. When picking the first lettuce and spinach, thin the crowding plants and use these on the table. The first thinning of beets may be used for greens. If the carrots are not too thick the first thinning may be delayed until the roots are about a forth inch in diameter. These can be used on the table. Cooked with peas they're delicious. Root crops such as carrots and beets should be spaced about one and one-half to two inches apart. Parsnips which normally grow to about three inches in diameter should be given a little more space. In light soils thick root crops push each other out of the way if left thicker than usual in the row.

The yield of sweet corn is often lessened because of stands that are too thick. Ordinarily the equivalent of one stalk to every 14 to 18 inches is adequate. This means that if it is planted in hills, each hill should have two to three stalks. Where there is lots of moisture, more may be raised, and where moisture is scarce, fewer will produce more corn. Thin when the stalks are about three or four inches tall. Those gardeners who have been wondering whether or not it pays to remove suckers will be pleased to know that recent experiments indicate the "suckering" does not pay.

Irrigation

Irrigating the garden is beneficial during most seasons. By keeping the moisture supply

adequate the crops continue to grow from the time they're planted to the time they're harvested. On the other hand, if the soil is allowed to dry out, growth stops when the crops are partly grown. With potatoes, allowing the soil to dry out and then irrigating it causes knobby potatoes. With tomatoes, irregularities in moisture supply cause "blossom-end rot." Those who irrigate should always try to keep the soil moisture uniform.

The moisture content is about right when a handful of soil taken at a depth of four or five inches and pressed together in the hand, holds its shape when released. When it crumbles upon being released it is time to irrigate.

Training Tomato Plants

Tomato plants in the home garden are usually set closer than in commercial plantings with the idea that they can be staked. Staking by keeping them off the ground helps to prevent rot and to hasten ripening. Place a substantial five-foot to six-foot stake three or four inches from the plant at the time of setting. Putting the stake in early allows the soil to settle around it and does not injure roots. The stake may be driven with an ax.

Although there are different methods of training the plants a common one is to allow the plants to grow with no pruning and tie the stalks up to the stake. The first tie is made when the plants are about one foot tall. A soft string tied firmly around the stake about ten inches from the ground is then brought around the tomato stalks and secured. As the stalks continue to grow more strings are added. The stalks should not be permitted to bend down before adding new strings.

Pollinating Squash

Early squash blossoms sometimes fail to set fruit because they are not pollinated. Insects which normally do this important work are not active during unfavorable weather. Gardeners may insure a set of early fruits by hand pollinating the early blossoms. To pollinate squash the gardener must be able to distinguish male flowers from female flowers. Female flowers usually have a tiny fruit at the base of the flower. This fruit can be seen even before the blossom is open. All other blossoms are male and it is they that produce the pollen. Pick off a male blossom and dust the pollen from it onto the pistils of freshly opened female flowers.

Pick Partially-Grown Vegetables to Encourage Fruiting

Victory gardeners may extend the fresh vegetable season by picking the fruits while they're small and tender. Most gardeners are fully aware of what happens if sweet peas are allowed to bloom for any length of time without picking. This same principle applies with summer squash, beans and to a lesser extent peas. These crops, then, should be picked as soon as they are edible.

Fall Gardens

There is a long list of vegetables that grow best during cool weather. Some of these when planted in the spring start producing as soon as hot weather arrives, others continue to grow during hot weather but not as well as during cool weather. These cool weather crops, of which lettuce, spinach, canteloupes, beets, green sprouting broccoli, cabbage, turnips and rutabagas are some of the most important, may be planted so that they grow during the cool fall season. Generally they should be planted in July. To start them at this time, some irrigation is usually needed. Most Victory gardeners can water the fall garden just as they water the lawn. The opportunity of extending the fresh vegetable season by growing a fall garden is so great that no one should be without a fall garden.



From a Garden Notebook

YOUR garden is becoming more important to you with each passing day. Reflect, if you will, upon these statements:

A recent radio report indicates that, of fourteen vegetable crops normally produced in Southern California for shipment to many parts of our country, only *one*, cabbage, will be harvested in sufficient abundance this year to ship. The crops of the remaining thirteen are so short that they will be insufficient to feed even the Southern Californians.

Floods in the Middle West have damaged agricultural crops to the extent of an estimated \$40,000,000. Winter wheat, damaged severely in some important sections, is being plowed up and the areas planted to other crops.

The most critical period will be reached in

December, January, and February of the coming winter.

You can give your family some measure of protection against the hazards implied above by organizing your garden planting for maximum production during the remainder of this season.

Consider these possibilities:

1. You still have plenty of time to prepare the soil for, and to plant, the main crop of potatoes. In Western Washington the recommended planting date is June 25. The history of the potato marks it as one of our most efficient famine fighters. Its tremendous development in both Ireland and Germany stems directly from its facile production of much-needed calories.

2. Dried beans, easily grown and easily stored, are even higher in caloric value. You still have plenty of time to get them in.

But if the worst comes and you are forced to depend on these two vegetables alone, your table will be quite dismal and monotonous. It need not be so because:

3. You can plant Savoy cabbage seed about July 1. It will give you green, growing plants all winter long. If you are in doubt about its ability to live through the winter be assured by the fact that some of us had plants which survived beautifully the rather severe conditions of the winter just past.

4. You can plant southern curly mustard about July 15. It, too, survived last winter's siege.

You all understand perfectly what an important part psychology plays during wartime. It influences both the man at the front and the family that stands behind him. A favorable psychology during the approaching months and years will be an absolute essential. It will appear and develop, in one way or another, as the "moral tone" of our troops and our civilians. High morale is just as important behind the lines as it is up there where the steel is flying. A larger *quantity* of food on your table, the better *quality* of it as it comes from your garden, and most certainly the greater *variety* of it that your garden can assure, will have the effect of heightening morale on the home front. To add a bit of variety, why not:

5. Put in some Swiss chard seed about July 15. When the plants grow to five or six

inches, transplant them and space them out ten to twelve inches apart. They will develop husky leaves and roots before winter closes in. When the weather moderates next March put a half handful of fertilizer around each plant. In April and May you should harvest the most beautiful, most tender stalks and leaves that have graced your table. Do not overlook the thick creamy-white stalk. It is the tastiest part of all.

6. Plant some Little Marvel peas about July 15. You will have to water them to assist in germination and early growth and, of course, they should be located in a cool part of the garden. Don't bother to stake them and don't worry about October and November frosts. You are saving these for a special occasion—fresh peas from your own garden for Thanksgiving dinner. See if it doesn't give you a bit of a lift.

7. Plant a number of hills of Golden Bantam corn on or about July 15. Save them for Thanksgiving, too. Keep in mind that you must use quick-maturing varieties at this late date. Hence Golden Bantam and *not* one of its slower hybrids.

No one should be disheartened if time has not yet permitted the establishment of a vegetable garden. The gardener can begin soil preparation right now and be assured of a considerable crop by fall. Of all of the vegetables which your friends and neighbors now have growing in their gardens, for only two, peas and spinach, is the season too late. For all others there is still ample time. Beets, bush beans, pole beans, cucumbers, late potatoes, corn, broccoli, chard, onions, carrots, squash, lettuce, mustard, and cabbage, cauliflower, and tomatoes, if plants of the last-named three can be procured.

For the late-planted garden, certain additional precautions should be taken. These suggestions will apply to the second and third plantings in an early garden, too.

1. Use more water. Watering should be started just as soon as the seeds are in the ground.

2. Vegetables which are attacked by the cabbage root maggot will need extra protection because of the greater abundance of the insects during summer and early fall. Turnips, rutabagas, radishes, cabbage, cauliflower,

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Coulter Pine

A California pine of distinctive appearance and of real worth where space permits is the Coulter pine (*P. Coulteri*, Don.). It has proven its hardiness in the Puget Sound region and takes distinctiveness from its rather coarse habit, which in turn is dependent upon a heavy branching system supplemented by extra-long, nine-inch needles, three in a cluster.

* * *

NORTHWEST TREES

(Continued from Page Three)

further detail. A little study with a good manual such as Sudworth's "Trees of the Pacific Slope" and the writer's "Keys to the Native Trees of Oregon and Washington" will soon enable anyone interested in the study of trees to recognize them all, and it will open the way for the more interesting study of their life habits, distribution, and associations.

Following is a list of the scientific names of the genera discussed in this article together with a number following the name indicating the number of local species in each.

CONIFERS: *Pinus* (pines), 8; *Larix* (larches), 2; *Picea* (spruces), 4; *Tsuga* (hemlocks), 2; *Pseudotsuga* (Douglas fir), 1; *Abies* (true firs), 7; *Sequoia* (redwoods), 1; *Taxus* (yews), 1; *Libocedrus* (incense cedar), 1; *Thuja* (western red cedar), 1; *Chamaecyparis* (true cedar), 2, and *Juniperus* (junipers), 3.

HARDWOODS: *Acer* (maples), 3; *Cornus* (dogwoods), 1; *Fraxinus* (ashes), 1; *Sambucus* (elderberries), 2; *Quercus* (oaks), 3; *Arbutus* (madronas), 1; *Rhamnus* (cascara), 1; *Salix* (willows), 7; *Alnus* (alders), 4; *Prunus* (cherries), 2; *Betula* (birches), 2; *Corylus* (hazel), 1; *Celtis* (hackberry), 1; *Crataegus* (thornapples), 1, and *Populus* (poplars), 3.

* * *

There are a great many birches planted along streets and about homes in the Northwest. Unfortunately, most of them are forms of *Betula pendula*, Roth., the European birch. It would have been far better had the paper birch of Eastern United States been used. This latter tree exhibits the same clean, bright bark but its leaves are larger and it seems to take on a much brighter golden hue in the fall.

FOREST INDUSTRIES

(Continued from Page Seven)

with opaque paints to produce desired colors. Recent research has developed the possibility of producing a wide variety of surface finishes during the manufacturing process by gluing resin-impregnated paper to the surface of the sheet. By using thin paper the natural wood figure may be retained and a wide variety of colors will be available.

There are many other forest industries in this state that are worth mentioning. The furniture industry of Washington utilizes red alder, broad-leaf maple and several of our softwood species to produce medium and high grades of furniture, and is generally geared to the available supplies of these species. It is unlikely that any spectacular developments will come in this industry, but present levels of production will probably be maintained and could increase slightly.

The wooden box industry in this state utilizes chiefly ponderosa pine and Sitka spruce. Prior to the war, wooden boxes were gradually being displaced by paperboard containers for packaging many products; however, the demand for strong, sturdy boxes for shipping ammunition, machinery and other heavy products has greatly stimulated the production of box shook in the past two years. Although paperboard containers will continue to take some of the market, many products requiring rigid, strong containers for long distance shipping will continue to use wooden boxes. Washington apples and other fruit products are among the biggest users of this forest product.

The wood preservation industry in this state is another that deserves particular mention. Wood preservative treatments are designed to prolong the life of wood in exterior situations and thus increase its ability to compete with other structural materials. Most of these treatments require a substantial amount of equipment in order to pressure-treat ties, poles, piling and heavy structural timbers. Developments in dip treatments designed to protect planing mill products such as sash and doors and trim sets mean that such treatments can be accomplished in the manufacturing plant. Moisture-resistant coatings and anti-shrink treatments are other possibilities along

this line designed to increase the usefulness of wood products.

Possible New Products and New Uses

In forecasting the future one's thoughts turn inevitably to the new products that may be developed. Through the efforts of the U. S. Forest Products Laboratory at Madison, Wis., a new wood product, "compregnated wood," has been developed and is being utilized in several war industries today. Compregnated wood is wood saturated with resin and compressed under high pressure, which considerably increases its density. Such wood is nearly as strong as mild steel, although weighing only about one-fifth as much. It can be worked with tools, glued or fastened with metal fasteners and can be given excellent polished surface finishes. Perhaps the most interesting aspect of this new product to the state of Washington is the fact that it may make use of many different species and thus may offer uses for the inferior or so-called "weed species" that have little commercial value today. *Abies amabilis*, silver fir, is a good example of a native species of this type.

Under the auspices of the Washington State Planning Council, the College of Forestry of the University of Washington has for the past two years been engaged in a study to find uses for the unutilized material that is left on the ground after logging. As an outgrowth of this program the college has perfected a method of deriving cork from the bark of the Douglas fir that compares favorably with cork produced by the Mediterranean cork oak. It is expected that a pilot plant will soon be erected in the Puget Sound area to manufacture this product. The future of cork production as an industry in this state will have to await the results of this initial plant but the possibilities are there.

The tannin industry in the United States has been largely localized in the East due to the cost of transportation of this product to the tanneries. Tannin substances have been imported from South and Central America to make up the deficiency in domestic production. Since the war has cut off these sources of tannin some efforts have been made to revive the process of extracting tannin from the bark of western hemlock, a rich source of this material. The future possibil-

ties in tannin production will depend largely on trade relations and tariffs that are worked out after the war.

The export markets for forest products from the Northwest have practically disappeared since 1930. The Sino-Japanese war deprived us of our Oriental markets and the world-wide depression during the early '30s brought about many changes in the trade policies of some of our best customers in the British Empire. It is likely that after the present conflict we shall regain some of these markets and it is probable that considerable expansion of the export market in South America will take place. Reconstruction of devastated Europe will take large quantities of construction materials, some of which may be supplied by the Pacific Northwest.

Any consideration of the future of the forest industries in the state of Washington must necessarily recognize the need for proper planning for future timber crops to make these developments permanent. Many of the large timber-holding corporations in the state are cognizant of this fact and the establishment of "tree farms" is a solid indication of such policies. Selective logging is being more widely practiced than ever before, particularly in the ponderosa pine holdings of Eastern Washington. Cutting plans that look forward to 100 years of sustained yield while cut-over areas are restocking and maturing are being worked out by large operators. Increased standards of utilization made possible by research sponsored by industry and the state are other evidences of the existing awareness of this problem.

The development of sound forestry practice as advocated by federal, state and private agencies is also reflected by small operators who are dependent on these bodies for guidance. It is likely that legislation will ultimately be passed regulating forestry practices in accordance with recognized principles, as has already been done in many other states. In the final analysis it can be fairly said that every citizen of Washington has a stake, tangible or otherwise, in its forest industries and therefore all are interested in its future.

AMONG OUR CONTRIBUTORS

(Continued from Page Seventeen)

The Pacific Northwest has, in the cascara tree, (*Rhamnus Purshiana*, D C), a species which has brought world-wide recognition because of its unexcelled medicinal qualities. As the native stands of the tree have become decimated because of insufficient protection and improper conservation ideals a trend towards commercial planting has developed. In the light of present conditions it would seem that such commercial planting may have bright possibilities. It is with pleasure, therefore, that we present a report on the tree and its culture by Dean Forest J. Goodrich, of the University's College of Pharmacy, who, by virtue of many years of study of and experience with cascara, is in a perfect position to give good, sound advice on the subject.

The Arboretum has had many enthusiastic supporters in Eastern Washington. Among them the names of two brothers, Mr. Hiram B. Ferris and Mr. Joel E. Ferris, have always appeared. The former has interested himself in nut trees and their culture to the virtual exclusion of other plant types and to the extent that he has become an outstanding authority on the subject. We present his article at a time which we feel to be particularly opportune, because of the growing interest in the possibility of producing nut crops, both in the home grounds and in commercial plantings, in many sections of the Northwest. The discussion also permits us to publish information that has definite value to our members east of the Cascade mountains.

In the Northwest there are any number of reliable sources to which we could go for information and timely hints on the highly important subject of producing vegetables for home consumption. Of them all none is more outstanding than the staff at Washington State College, Pullman, where the name of Dr. John C. Snyder, extension specialist in horticulture, stands high on the list. For information upon which you can absolutely rely we present his discussion of what you should be doing to get the most out of your victory garden.

ORNAMENTAL TREES

(Continued from Page Fifteen)

that blooms profusely. The leaves take on interesting shapes and become strikingly colored each fall. 30 feet. East and West.

Sophora japonica—the Chinese Scholartree. A clean, green-twigged, broad-crowned species that reaches ultimately to 25 feet. It produces large sprays of yellowish flowers in summer. West.

2. Selected list of trees which lend themselves to planting either along streets and highways where there will be no interference from utility wires, or on the large home grounds:

Aesculus carnea—Red Horsechestnut. This species is particularly beautiful in spring when it is covered with masses of red flowers. 40 feet. East and West.

Aesculus hippocastanum—Horsechestnut. A strong-growing tree that will withstand a wide range of extreme conditions. It will attain a height of 70 feet. East and West.

Ailanthus glandulosa—Tree of Heaven. An exceptionally hardy species that will thrive under very adverse conditions. Use male trees only where a choice can be made. 50 feet. East and West.

Betula papyrifera—the Paper Birch. This species is superior to the European form, *B. pendula*, which has found more widespread use. Its bright yellow leaves in the fall and the picturesque white bark render it a great favorite. For the best effects plant it in front of tall evergreens. 40 feet. East and West.

Betula populifolia—Gray birch. A more delicate form than the above and very graceful. Adapted to similar uses. 40 feet. East and West.

Fagus americana—the American Beech. Beautiful, majestic, slow-growing. 60 feet. East and West.

Fagus sylvatica—the European Beech. A grand tree that has produced a number of valuable variant forms. The purple-leaved type has found particular favor. The height varies from 25 to 75 feet, depending upon the type used. East and West.

Ginkgo biloba—Maidenhair tree. This beautiful species is closely related to the pines although it bears a broad, fan-shaped leaf. Its regular, uniform growth habits, its bright yellow fall color and its general cleanliness make it exceptionally worthwhile. East and West.

Gleditsia triacanthos—Honey Locust. You should consider yourself fortunate if there is enough space available to warrant planting this delightful tree. Not only does it become tall—to 70 feet—but also its crown develops remarkable depth and breadth so that the delicate lacy leaves, which turn to a bright yellow in the fall, are displayed to the best possible advantage. It casts a light shade, an important consideration on lawn areas. The thornless variety is to be preferred. East and West.

Hicoria ovata—the Shagbark Hickory. A very bright spot in the fall landscape can be produced by a group of hickories. The leaves

turn to a golden yellow and remain so for quite a long time before becoming brown. These trees are definitely big, need plenty of space, and like partial shade. East and West. 75 feet.

Koelreuteria paniculata—The Goldenrain Tree. Compound leaves, good fall color, slow growth and large, loose clusters of yellow flowers make this species a desirable one. 30 feet. West.

Liquidambar styraciflua — Sweet Gum. The firm, five-fingered leaves, covering a conical crown that often towers to more than 60 feet, turn to brilliant red, purple and orange shades as fall advances. It deserves much more widespread use. East and West.

Liriodendron tulipifera—the Tulip Tree. Although the orange and green tulip-like flowers are very attractive they actually account for only a small part of the popularity that the species enjoys. The straight, clean bole crowned by myriads of bright yellow-green leaves in the very early spring makes a delightful picture. Use it on all but the most exposed, windiest sites. East and West.

Nyssa sylvatica—Black Gum. Just why this species should have been overlooked for so long is not understandable. It has perfect symmetry of form and during the fall the shiny leaves turn to the brightest of colors. 40 feet. West and possibly some sections East.

Paulownia tomentosa—Royal Paulownia or Empress Tree. A coarse textured tree, to 30 feet, having all the attributes of the well-known catalpa. In the spring, however, before the leaves appear there are borne the hundreds of blue and purple flowers that make it so outstanding. A warm, protected position is required and it will probably not grow at all well on the East side of the Cascades. West.

Platanus occidentalis—the Sycamore. Here is a tree that needs plenty of room. But if the space is available it is difficult to find one that has more character. Upright and straight though it is in youth, it becomes gnarled and picturesque in age. 75 feet. East and West.

Populus simoni—Simon Poplar. Ordinarily one does not regard any of the poplars as desirable species for home or street planting. But the Simon poplar is one possible exception. It is not a large tree, has a conical head that is covered with dense masses of small green leaves and grows fast. It is especially beautiful in very early spring when the new foliage takes on a bright yellow green that provides a striking contrast with the darker colors. Do not use it where it will be close to drainage tile. 35 feet. West.

Quercus alba—White oak. The oaks have always been regarded as worthy ornamental forms. Three good ones would be, *Q. alba*, *Q. rubra*, the red oak and *Q. coccinea*, the scarlet oak. General cleanliness and vigor as well as fall coloration are two of the points in their favor. Height 75 feet. East and West.

Robinia pseudacacia—the Black Locust. If you have a dry, hot hillside, or any similarly severe site that needs the protection of tree cover, this is the ideal species to select. It is a legume and will condition the soil as well as protect it. The pink-flowered variety called *decaisneana* is more ornamental. 40 feet. East and West.

Tilia americana—the American Basswood or Linden. The Linden tree is very popular for street planting in several parts of the world and well it might be for it has many admirable attributes that commend it for this purpose. The American species is somewhat less desirable than the European forms which have smaller leaves and a generally more reduced stature. The flowers, produced abundantly in the spring, are highly fragrant. East and West.

Ulmus americana—the American elm. The American elm has always found tremendous favor as an ornamental. In recent years it has been recommended much less because of the appearance on our shores of the Dutch elm disease which threatens to exterminate the large, old plantings in eastern United States. However, until the disease appears in the West there is no reason for discontinuing its use. The Chinese elm, *U. parvifolia*, is a grand type to use where less size is required. The heights—American elm, 75 feet; Chinese elm, 35 feet. East and West.

1 1 1 NUT TREES

(Continued from Page Nineteen)

berths is very necessary. This is done in the commercial orchards.

There are many places about the home, particularly in the country, where nut trees will add greatly to the pleasure of living. Good places are often available in fence rows, on rough land, or in odd corners around a country home or farm, odd corners that do not lend themselves to the growing of cultivated crops; in many such situations the nut trees will thrive.

“Trees of walnut, hickory, and pecan can furnish shade for the home, a wood-lot for the farmer, nuts that children may gather as their sires gathered them years ago, when frosts and the golden hues of autumn brought summer to a close. So we can pass on to coming generations a real inheritance that will become more valuable as decades and centuries pass.”

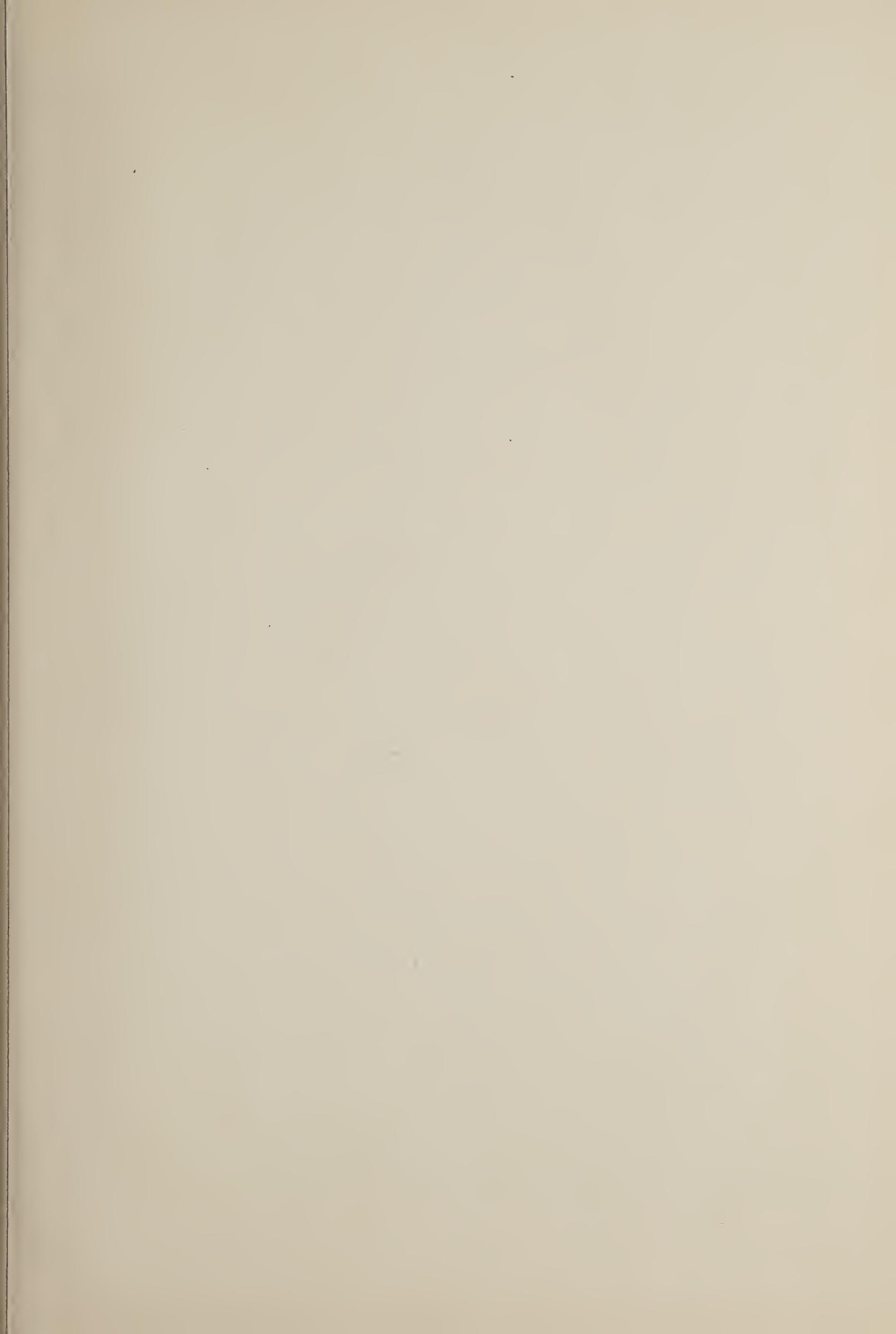
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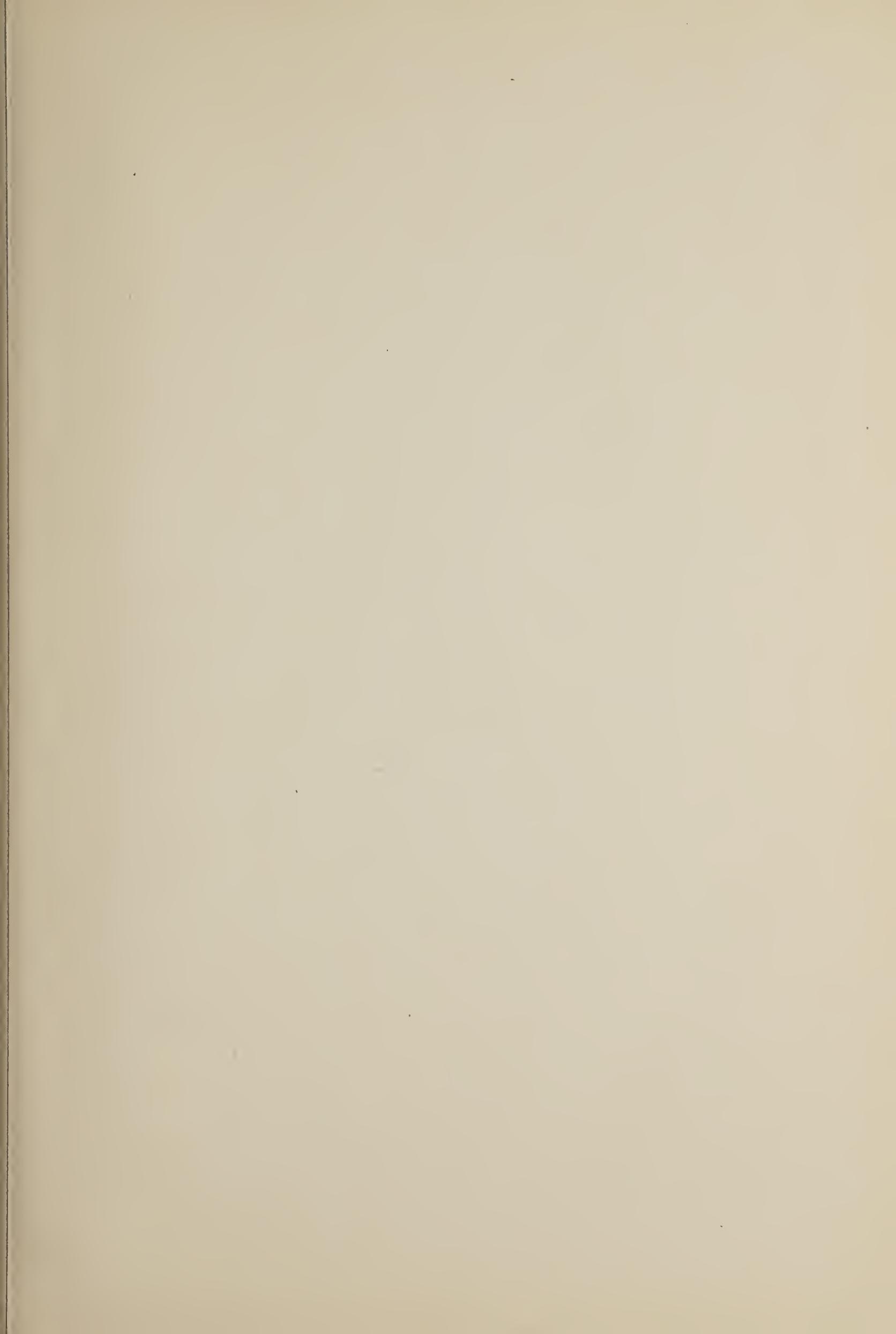
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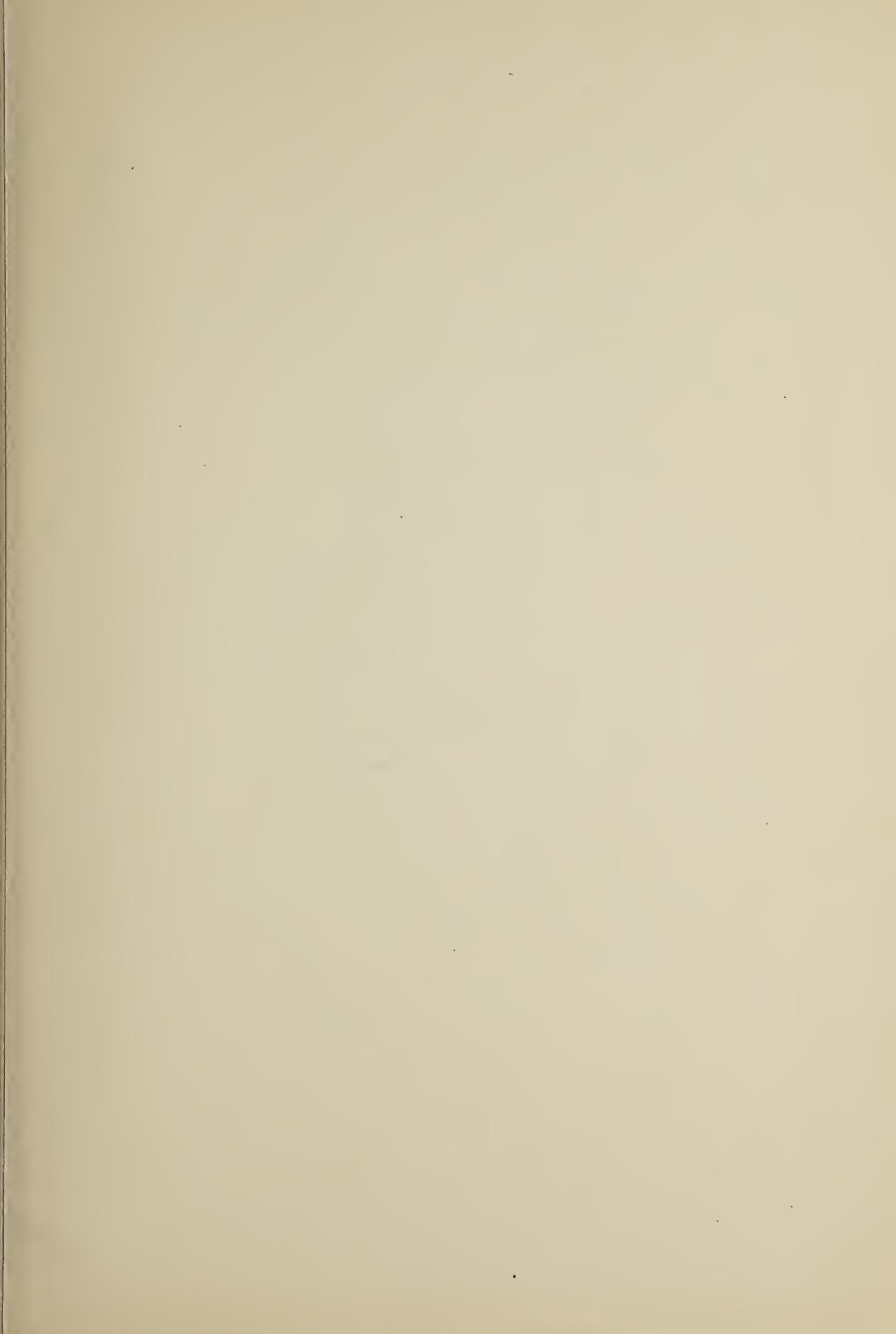
broccoli, and Brussels sprouts are all affected. Use plenty of fertilizer along the rows or around individual plants, and apply lots of water to keep all of them growing rapidly.

3. The carrot rust fly increases in abundance as the season advances. Keep ahead of it by the same method and be sure that naphthalene flakes are used periodically.

4. Cultivate,—cultivate,—cultivate, to keep down weeds and conserve moisture.







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